GREAT MINDS THINK ALIKE

Sociocultural Perspective on
HUMAN CREATIVITY
in the Age of Big Data

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Human creativity is in high demand in the 21st century, and it has been acknowledged that unlocking the creative capacity of the whole population would have major effects. However, while several surveys demonstrate that many people consider creativity a personal and an economic asset associated with individual and societal wellbeing, simultaneously many of them doubt their own creative abilities.

Even though findings from the field of cognitive neuroscience have shown that the phenomenon is intrinsic and we all possess creative potential, it is claimed that an average person holds stereotypical or dated ideas about creativity, which may explain why the discourse on creativity has suffered from so many misconceptions.

This study presents the hypothesis that current understandings of creativity are the result of numerous variables, such as general perceptions of the social status and the role of age. Some of these variables are then selected for in-depth investigation by using critical discourse analysis.

The results of this analysis suggest that a multitude of conceptions on creativity will remain until the science of creativity is established. Moreover, creativity is an ambiguous, socioculturally dependent and evolving phenomenon. Furthermore, miscommunication between different social groups can influence the public's views more than the myths or misconceptions about the phenomenon per se. The implications of the results and future research directions are presented here within.

Alongside of the research, an experimental concept of Metacognitive Process in Creative Self-Confidence was developed to explore the possible causalities of ambiguous creativity complex, current sociocultural environment, and individualistic perception on one's own creative self.

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Luovuudelle on suuri kysyntä nykyaikana. On käsitetty kuinka suuri vaikutus sillä olisi, jos koko väestön luova kapasiteetti voitaisiin valjastaa. Tutkimukset osoittavat, että vaikka valtaosa ihmisistä kokee luovuuden henkilökohtaisena ja taloudellisena etuna, ja assosioivat ilmiön sekä yksilölliseen että yhteiskunnalliseen hyvinvointiin, niin silti he itse samanaikaisesti epäilevät omaa luovaa potentiaaliaan.

Vaikka kognitiivisen neurotieteen alan havainnot ovat jo osoittaneet, että ilmiö on luontainen ja kaikki omaavat luovan potentiaalin, on väitetty, että silti valtaosan käsitys on stereotyyppinen tai tiedot luovuudesta ovat vanhentuneita. Tämä saattaa selittää, miksi luovuuden diskurssi on kärsinyt useista tyypillisistä väärinkäsityksistä ilmiöön liittyen.

Tämä tutkielma teorisoi, että yleinen nykykäsitys luovuudesta on seurausta lukuisista muuttujista kuten esimerkiksi eri näkemyksistä sosiaalisen aseman ja iän roolista luovuudessa. Tätä tutkielmaa varten vain osa monista muuttujista on valittu tarkasteltaviksi lähemmin, ja niitä on tutkittu kriittisen diskurssianalyysin avulla.

Tulokset viittaavat siihen, että erilaiset ideat ihmisluovuudesta pysyvät lukuisina kunnes vakaa tieteellinen perusta luovuudelle on luotu. Tutkielmassa todetaan, että luovuus on moniselitteinen ja alati kehittyvä ilmiö sekä se on riippuvainen sosiokulttuurisesta ympäristöstä. Sen lisäksi tutkimuksessa esitetään, että ihmisten yleisnäkemykseen luovuudesta on saattanut vaikuttaa luovuusmyyttejä ja yleisiä väärinkäsityksiäkin enemmän eri yhteiskunnallisten ryhmien välinen kommunikointi. Tulokset ja ehdotukset tutkimuksen tulevalle suuntaukselle esitetään tässä työssä.

Tutkimuksen rinnalle kehitetty kokeellinen konsepti; luovan itsevarmuuden metakognitiivinen prosessi, seuloo mahdollisia kausaliteetteja vaikeasti tulkittavan luovuuden ilmiön, nykyisen sosiokulttuurisen ympäristön ja yksilön luovan minäkäsityksen välillä.

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LUOVA ITSEVARMUUS
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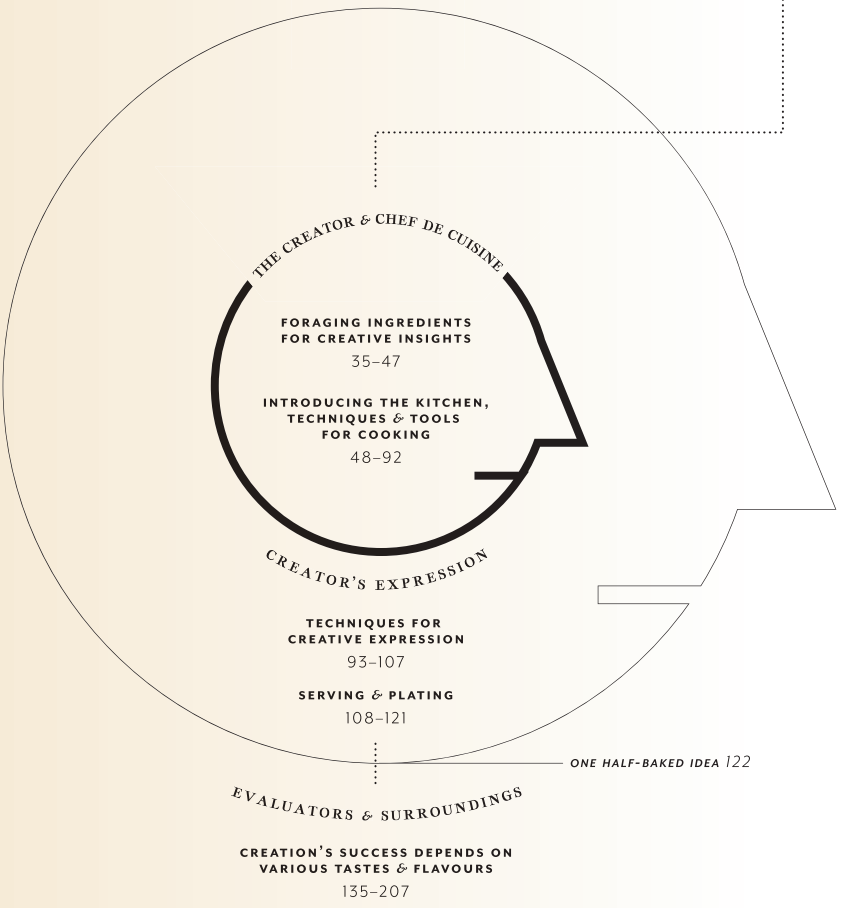
EXPLORATION

DISCOVERY OF THE MOST SAVOURY RECIPE

APPETIZERS



DESSERTS

for INDIVIDUALS HARNESSING THEIR full CREATIVE POTENTIAL

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Foreword

Explaining human creativity has been one of the toughest nuts to crack throughout the history. Like any other phenomena, that have been unknown for us at first and have generated a multitude of explanations before they were fully explained, creativity makes no exceptions.

Especially for the past 70 years, researchers have been studying what lies in the human mind that enables creative behaviour. Numerous studies and theories are involved in search of seeking the answers, and the technological advancements in last few decades have benefited greatly to these studies. Neuroimaging techniques have allowed computing the models of the neural circuits in the brain that are involved in creative thinking. Even though these mappings of the great unknown do not explain why some people are more involved in creative acts and some are not, they have concluded that everyone is capable to generate creative insights from normative data. These recent findings are often overlooked by the people or they are not familiar for the public.

Creativity by definition is a complex or a syndrome. Because the consistent theory is still missing, a considerable amount of diverse material about creativity is widely spread. It is available and easy to access for everyone and anyone, and because creativity is considered as an individual, societal and economic asset, the material attracts people and it has high media value. It has been suggested that the diversity of these materials have influenced on the common conceptions about creativity. These conceptions mainly date back to the Romanticists ideas. However, as the rough timeline of different conceptions on creativity suggests, the roots may reach even more far back in history—the phenomenon of creativity has a memory.

This study also proposes that it may be not only one facet that is involved with spreading dated, falsely interpreted, or narrow conceptions about creativity. Language resonates the sociocultural environment and the Zeitgeist, and after the word "creativity" has appeared in corpus in 1950's, since then, there has been radical drifts with the meanings of the word. These semantic drifts—or, moreover their similarities how the phenomenon has been described in written texts—has varied depending on the Zeitgeist. However, this topic is highly understudied and therefore it will be addressed only briefly in this thesis.

The last chapters of this study contemplates what would happen to the quality of creative solutions if the common conception on creativity would shift from demanding something original or unconventional to the

idolising appropriateness, longevity and usability. These prospects are meant to depict what human creativity could mean in the future, if the recent neurobiological findings are taken into account.

Accordingly, this study attempts to raise awareness about human creativity and establish a more rigorous understanding on how creativity manifests in an individual. **The purpose of this research is to encourage more and more individuals to harness their built-in abilities to create**. I addition, taking the target group of the concept into consideration, the content of this research is built by simplifying empirical studies and theories from scholarly literature. This study experiments how the actual concept could work in practice, and how far scientific content can be simplified before the original data gets distorted.

However, because of these simplifications—and even more, because of the simplifications are made by author's limited proficiency on the various other fields of studies that are included in the research, this thesis, its hypothesis, and the concept itself, requires thorough investigations by other professionals, before further developments on the concept itself can be done—further developments, which are most certainly required.

There is a number
of definitions for
CREATIVITY,
and various theories
that influence on
the consensus of it.

Creativity has puzzled people throughout the ages. Even though the first descriptions of the phenomenon dates back to the Classical Antiquity we still cannot completely explain what lies within human creativity.

Most of the theories in creativity have developed alongside with technological advancements—from the Industrial Revolution to the current Big Data Age. The advancements in technology and science have allowed us to study the human body and mind in-depth. From each scientific breakthrough there has been another, a new, and a bit "better" view on creativity. For this reason there is a lot of variety with the concepts, and it seems that they often represents the "trendy" discourse of each Zeitgeist.

No matter how insufficient, or even fallacious, the older concepts might have been, they have led the way for the modern studies of creativity. Moreover, the early theories that explains creativity from narrow and even biased viewpoints have not been completely abandoned even today, and the previous studies on creativity steer the direction of the modern approaches, too.

Fortunately, today's creativity researchers are looking at creativity from a wider angle and not *only* in the light of older studies. Today "creative studies are ***interdisciplinary*** (…)", and creativity is investigated e.g. from "(…) behavioural, clinical, cognitive, developmental, economic, educational, evolutionary, historical, organisational, personality, and social perspectives". (RUNCO 2007, PREFACE, X)

The most recent scientific field that has took part in creative studies; ***neuroscience***, explores the phenomenon through computational qualities of human creativity. Neurobiological studies investigates what occurs in the human brain and its nervous system during creative performance and creative thinking. Neuroscience is multidisciplinary science that encompasses structural, functional, and chemical features of the brain. It takes also into account the other approaches that explain human embodiment and its functions from developmental and evolutionary points of view, for example. (VARTANIAN ET AL., 2013)

From the mid-20th century until the past decades creativity research has been focusing on psychological and biological features of an individual in order to explain creativity. **Most of these studies have been focusing on well-known "creative individuals"; eminent artists and scientists, and what *differentiates* them from the majority of people.** In order to find anomalies, the previous studies have been investigating the famous creators by their personality, daily habits, social behaviour, or how their ideation has took place. Researchers aimed to explain the mystery behind the creative outcomes, that genius minds had been able to generate. From those starting points the frame for the current studies has been built as well, and the older studies gave a frame for what to look for when we are looking for an explanation to human creativity.

Even though different branches and approaches of the modern creativity studies aims to lessen the vagueness around the creativity complex, it is the broadness of the phenomenon that makes "creativity" difficult to explain only from one point of view (RUNCO 2007; VARTANIAN ET AL. 2013). Studies on creativity are interdisciplinary because ***the science of creativity is still missing***.

Creativity is an ambiguous phenomenon
that manifests in numerous ways.
The vagueness of the word "creativity"
allows multiple interpretations.

When I have been asking people what creativity means to them, I have got a variety of answers. Some of them described a person whom they considered creative, and the physical appearance or special characteristics of the person (e.g. imagination, inventiveness). Others explained creativity through specific emotion or an expression; that creativity is some sort of a talent or a creative action. The third most common answers were taking the creative outcome or the product itself into account. In general people saw being creative as a personal asset, because harnessing creativity has empowering influence on an individual.

The word *creativity* can mean several things for the people. For the most of them, it is difficult to distinguish whether it is about the *creator, creative production,* or the *creation*. Hence, it is only natural that without a particular interest on the topic, "creativity" allows numerous explanations (SAWYER 2006; RUNCO 2007) (IBID.).

These explanations vary according to whom is asked, who is asking, in what situation, and/or in which social setting. It is not that creativity would not interest people, nor that creativity would have a bad reputation. It is just that ***creativity has many forms how it manifests*** and people have very different ideas about the phenomenon. However, the modern studies of creativity explain the phenomenon of human creativity quite unanimously.

I was unable to find a reliable survey for this study that would investigate how people understand or perceive creativity. The issue of reliability is that almost everyone has an idea about "creativity", and depending on the facet that is asking, the facet itself can prompt biased answers. People often associate creativity with artistic tendencies, and if the facet is involved in artistic fields it can steer people's answers and generate biased answers.

For example, in 2014 a Finnish company 925 Design conducted an online survey "Suuri Luovuuskysely" (transl. The Big Questionnaire of Creativity). Over 1,000 Finnish employees responded to the survey. Almost all of the respondents believed in their own creative abilities, and 85% of the respondents believed that they can improve their creativity significantly (Tuominen 2014).

Similar phenomena occured, when I asked people who knew what I do for living: They viewed their own creative potential in a more positive light. However, when the setting was neutral, and the person whom I asked about creativity did not know my occupation, I got completely opposite answers (e.g. The Story of Woodchopper-Caretaker, p. 131).

That is one issue I try to tackle in this study. I try to find out *why* the findings from the field of creativity have not reached the public yet. It is not that the most recent studies would not be available. In fact it is the opposite, and the findings have been available for everyone for almost two decades.

Yet, for a wider audience creativity is just as vague phenomenon as it was decades ago. Even though some classifications about "who is creative and who is not" are dated or highly questionable, they still linger among the public. In addition, what people may not know, is that the phenomenon has conformed time and sociocultural environment throughout the history.

WHY ONLY SOME PEOPLE HARNESS THEIR CREATIVE POTENTIAL?

According to Adobe's survey (2012) that involved 5,000 adults from five different countries (1,000 per each); US, UK, Germany, France and Japan (p. 2), 8 out of 10 were confirmed that creativity is the key to economic growth (p. 5), but **only 1 in 4 people felt that they are living up to their creative potential** (p. 7).

In US over a half (52%) of the people described themselves creative, and a bit less of the people in Europe thought similarly; UK (45%), Germany (43%) and France (36%). In Japan only 19% of the people described themselves creative (p. 8). Nearly two thirds felt that being creative is valuable to society (p. 6), and 3 in 5 felt that it is important to themselves (p. 10).

6 in 10 respondents considered themselves to be someone who creates (p. 12). **If considering the creative capacity of the whole population, the study suggests that there is a 40% piece that is unharnessed from the creative capacity that would be available—more likely even more that**.

There are several reasons that can explain why half of the people did not consider themselves creative, and the misconceptions about the phenomenon may explain that bit. However, the other explanations may lie in the rather creativity-hostile environment.

The current Zeitgeist is not exactly supporting individuals to manifest creativity. The setting is filled with time constraints, and toxicated by an idea that creativity is about generating something unforeseen and spectacular.

Seppälä (2016) points out that "in a time and age when everyone is overscheduled and overfocused, creativity is more and more prised—it's the key to your effectiveness and success, in life and in business" (SEPPÄLÄ 2016, P. 98). However, according to Adobe's survey (2012) there is not enough resources to be creative.

The open-ended and unaided questions in the survey (e.g. p. 9) reveals that people do have an idea what *productive and functional creativity* would require, and that is: **More time, less pressure to be efficient at the same time, proper tools to create, and an environment that allows creativity** (STRATEGYONE & ADOBE 2012).

Seppälä (2016) continues that for an individual creativity "can be a never-ending source of joy and happiness because it helps you find better way to complete your work and come up with novel ideas that make you better at what you do." (SEPPÄLÄ 2016, P. 99).

WHAT'S THE POINT TO CREATE ANYTHING?

> Because "so many ideas have already been used" (StrategyOne & Adobe 2012, p. 28) an individual may think that there is no point to create if you cannot deliver something that has an impact. Tuominen (2012) reports similar results and that people do not take an action because they trust that someone else, someone, who is "more creative" or innovative does.
>
> In Adobe's study people considered that they are only spending one-third of their time being creative, and that at work there is increasing pressure to be productive rather than creative (75% of the all respondents) (StrategyOne & Adobe 2012). In contrast, according to another survey by IBM, creativity was considered the most important skill that is needed in navigating today's business world in all vocations (Seppälä 2016).

Creativity *is* a personal asset, an ability. Moreover, creativity *can* be enhanced and trained. We *all* possess creative potential, that potential can manifest in various ways.

However, the creator in the equation of creativity just got forgotten. The reason of why, *why* we have an ability to create in the first place, simply got lost in numerous wild interpretations.

At the end of the day human creativity is nothing else but data. An organic synthesis and an interaction of the internal and external data.

Creativity occurs when the bits and pieces of information collides. That collision always generates novel combinations —new pieces of information that did not exist before.

Whereas the older studies of creativity dug into differences between the ordinary and creative individuals (i.e. creative elite), the modern studies examines the phenomenon as a measurable *process*.

Neuroscientific studies have been able to empirically point out that what makes ordinary thinking different from creative thinking is ***the moment of insight***; a creative product that is generated by the ordinary mental processes of an individual mind.

> "Small wonder some theories of creativity emphasise insight, and other divergent thinking, adaptable or flexible thought, or various kinds of problem generation and problem solving. There are different ways to be creative and different neuroanatomical structures and circuits to support them." (RUNCO 2007, P. 86)

It is not that any of these people whom I asked "what is creativity" would have given wrong answers. They were all correct in a sense that people have an understanding—a personal idea or perception about the phenomenon. It was delightful to notice that everyone had at least some kind of opinion about the topic.

For me, it only assured that people do contemplate what creativity is actually about, even though they would have difficulties with defining it, or putting it in one same kind of box. However, according to my casual survey which is yet scientifically invalid, I have no doubt that the older concepts on creativity would not have any influence on people's ***personal ideas about creativity***.

However, the ability of insightful thinking is a built-in feature in everyone's brain. Generating insights does not necessarily demand an extra effort from an individual either, because this feature is rather automatic. However, the quality of insight could be and can be improved.

Enhancing creative thinking depends highly on the goals that what kind of solution is in question. The tactics in creative thinking can be practiced, and indeed, the recent findings from the field have shown that ***creativity can be trained***.

However, what, who and/or which facet evaluates the quality of insight varies. By definition, "creativity" is evaluated in terms of how *original*, *novel* and *appropriate* insight, an idea, or the solution is. Even then, the success of a creative insight does not depend solely on an individual—it is more complex than that. Furthermore, this three-step scale varies according to which facet is evaluating the creative outcome at the time.

CREATIVITY, CREATOR, CREATIVE, CREATION…

Runco (2007) has suggested that the word "creativity" should be stricken from the scholarly research literature, because the ambiguity of the word. "Creativity" should be avoided because **it is a very general and abstract noun and it can refer to creative potential, creative performance, creative tendencies, and even creative personalities** (Runco 2007, p. 320).

"Various historical events and situations seem to influence creativity, among them war, civil unrest, and economic ups and downs. Yet one of the most significant influences on creativity is Zeitgeist, the spirit of the times. This is manifested in attitudes, expectations, and assumptions about creative things and creative people. This is what draws people into creative endeavour—or scares some of them away from it." (Runco 2007, p. 259)

In addition, if someone still wonders if creativity can be enhanced, Runco addresses this question by saying: "'yes, creative potential can be fulfilled' and 'yes, creative performances can be made more likely.'" (Runco 2007, p. 320).

However, this study investigates the missing data—the question that follows Runco's statement, and that is: **Why collective creative capacity has not increased since enhancing individual creative capacity is possible?**

The phenomenon of human creativity is time and place dependent. What is more, the value, or success, of the creator and the creation is determined by the sociocultural environment and an on-going Zeitgeist.

In this study "creativity" is explored mainly from the frame of creative self-confidence. The concept of "creative self-confidence" was created for investigating different variables that are involved with the phenomenon, and what things could explain why someone doubts their own creative potential or abilities.

Exploring the discourse of creativity and the communication between the facets

Creativity is an individual, societal and economic asset, but has it always been like that?

One topic that has been lacking from most of the discourses, is *the matter of surroundings impacting on the concept of creativity*. Moreover, how exactly the environment can influence on an individual acknowledging their own creative potential. ***Sociocultural factors*** form expectations, and set demands or responsibilities towards an individual in many levels, and from creativity point of view, that impacts especially whether or not an individual trusts on one's own creative capacity. However, the expectations, for example, are dynamic variables and the sociocultural factors define what kind of creativity is valued in which era. From the Classical Antiquity up until now, there are significant differences between Zeitgeists.

There are numerous heroic stories about exceptionally intelligent or talented creative individuals that are all written in the history books. Some few other people; like e.g. savants or untrained inventors who managed to do something *different* without any obvious efforts are raised on societal pedestals as well, but their creative accomplishments are often compared to pure luck or praised by the anomalies of their human bodies.

For a "regular" person—average Joes and plain Janes—these stories may be difficult to relate to. As a matter of fact, they can even expand the gap between the "creatives" and the regular people, and make creativity as a personal asset or a privilege only for some. Creativity has become something that only the chosen ones can have an access.

There is nothing wrong about heroic stories nor gaining recognition through innovations, because they are often also *inspiring more people to create*. However, these stories should be reflected and critically investigated together with the sociocultural variables.

Also, the nature of ever-failing, *imperfect solutions* should be presented for both; for inventor per se and for the society surrounding an individual. Books are full of examples about inventions that simply had a wrong timing and stories about innovative people who never gained recognition in their lifetime.

Creativity is a complex or a syndrome, and the definitions of "a creator" or "a creation" resonate the demands of each Zeitgeist in each sociocultural environment.

Then there are examples in the present time where a solution, that was once invented by one of the creative heroes and was highly appreciated by the society, is failing us right now. **How come we tend to forget these stories?**

In the end, it is the sociocultural environment that determines whether a solution is *appropriate* or *useful*. Often times our solutions are short-sighted, and they would require thorough evaluation in order to improve the quality.

Conceptions on creativity have changed throughout the history.

Before neuroimaging techniques were available, many theories about creativity leaned on the written and spoken records about famous historical ***mad geniuses***. Without these people—or rather, without societal interest and the limelight directed on them we would not know much what kind of creativity was appreciated at each time.

Historiometry draws a timeline; a continuum for the scientific approaches today, that sheds light upon creativity that *did* capture the limelight. In other words: That kind of creativity that gained validation from the particular sociocultural environment. Heroic stories from the history interfere with people's opinions about creativity still today, even though some of them are proven erroneous quite a while ago.

Without making today's sociocultural environment Aunt Sally (i.e. a thing set up as an easy target for criticism), it is quite evident how it is keeping some of the dated misconceptions about individualistic creativity alive even though the actual creative potential is hidden in all of us.

Today's sociocultural bias on creativity still idealises particular type of people which may explain why other, the *ordinary* people, find it hard to acknowledge their own creative potential. Even though neuroscientific research on creativity has presented valuable evidence about the intrinsic creative potential in all humans—and that it belongs naturally for everyone, I believe that the findings lose their impact, if they are not reflected on things that are already familiar to the public. Therefore I think it may be more helpful to explore different conceptions about creativity through the lens of history, because those stories people already partly know.

The experimental concept of the Metacognitive Process in Creative Self-Confidence

Why creativity is not equally shared asset among the people, even though we already know that is a very natural phenomenon? Creativity is often entangled with misconceptions in the Western cultures that can make many people doubt about one's own creative potential—that is one. However, even though creativity seems to be something that is out of reach for most of the people, there is, in fact, an enormous creative potential hiding in the society.

I argue that there would be individual and societal benefits in raising creative self-confidence. It would be an investment for the future, because at the moment **human creativity is an underestimated human resource**. In addition, creativity does bring fulfilment and joy to an individual. Creativity equals something meaningful, and it is acknowledged to have a positive impact on an individual physically and mentally. (RUNCO 2007) "Creativity is one of the most positive, life-affirming traits of humanity, and people in all walks of life report that they feel at their peak and in flow when they are being their most creative." [CSIKSZENTMIHALYI 1990, ABOUT "ARTISTIC CREATIVITY"]." (SAWYER, IN CITED CSIKSZENTMIHALYI, 2006, P. 10)

From harnessing an individual creative capacity to its fullest, it can enhance not only individual, but societal wellbeing too. Besides relevant debates as to why everyone's individual creative capacity should be harnessed more carefully, various theories and studies also show that if we can convince more people to improve and use their creative capabilities, creativity could have a major positive effect on a societal level. Like Guilford has stated: "If by any approach we could lift the population's problem solving skills by a small amount on the average, the summative effect would be incalculable." (RUNCO, IN CITED GUILFORD, 2007, P. 53)

RESEARCH QUESTION/S

> Even though an individual problem-solving skills could be enhanced, it does not still explain why some people do not manifest their built-in, hidden creativity. What would it take to raise their motivation, and make them to believe in oneself that they can, and that they *should* take their creative potential in better use—what would it take to lift the population's ~~problem solving skills~~ **creative self-confidence** and encourage more people to take action?

HYPOTHESIS

> I believe that changing people's ideas and attitudes about creativity should begin from raising awareness about the whole phenomenon of human creativity and what it means in the age of Big Data. In order to get the message through to a wider audience, it would require developing the sluggish social metacognition about creativity in multiple channels. In addition, in order to raise public awareness about the phenomenon, I consider that at first, it would require further investigations what creates the gap between the creativity researchers and the people.

What are the classic ideas about creativity?

The most common misconceptions that people seem to hold, are the ideas about ***the small creative elite***, the idea that anything smaller than an ***innovation*** cannot be creative, and that creativity is ***a spontaneous act that arise from sudden bursts of inspiration***—or, from the pain of an artist. All of these ideas stems from the Western adoration of eminent individuals. All of these ideas depict the most common misconception on creativity, and that the modern researchers call by the name: **Mad Genius myth**.

Throughout the years researchers have focused on eminent creators, when they have been seeking an explanation for human creativity. For example, some older studies on creativity were conducted by the bibliographic studies, that have influenced on the implicit theories that were assumed to predict or measure creative tendencies of a person.

However, the admiration of ***individuality*** in creativity dates back to Romanticist era. The older studies have also focused on an individual's physical, hereditary and developmental factors; personality; psychological and mental abilities and anomalies; expertise, skill or a talent, and social behaviour. Yet, neither of these theories and studies alone have not been able to explain what is human creativity.

"Romanticists redirected the focus from collectively created solutions to individual self-expression. Individuality that was a trendy topic back then. It bloomed again among personality theorists 150 years after the Romanticism, and is has been quite popular explanation for creative success since then. Only very recently individuality on creativity has been questioned by the researchers: As a matter of fact, any creation can be seen as a social product that has involved more than one person."

(Sawyer & DeZutter 2009; Sawyer 2011)

How the 21st century researchers define the phenomenon of human creativity?

Modern creativity research acknowledges three main types of creativity: ***exploratory, transformational and combinatorial creativity***. Neuroscientific studies focus only on the last type which is measurable and has computational qualities (i.e. combinatorial creativity) (BODEN 2013).

Even combinatorial creativity is not completely understood today and the field of study is still rather new. However, what we *do* know, is that an individual can train and enhance their creative abilities. We know that combinatorial creativity is a result of normative data, that an individual mind has collected and recombined into something novel. The personally possessed normative data has been gathered from the vastness of external information: Throughout one's lifespan. An individual has absorbed the vital data from one's surroundings, and stored it in the parts of the brain that are not at one's reach all the time—that information is not constantly in the consciousness, but yet it is there—safely at store and readily available.

We also have ideas about what kind of headspace, which type of conscious physical actions, and what sort of an environment are optimal for combinatorial creativity. In other words, we have the knowledge how an individual creativity can be enhanced and optimised. We have tactics how to lure out the most creative idea that is hidden in one's mind.

There are numerous self-help books, documentaries, and tips and tricks online, that are meant for optimising the state of mind and one's surroundings for combinatorial creativity.

However, neither of these tactics that improve creative thinking do not assure that an individual would become "creative" by the eyes of other people, nor that the person who masters creative thinking would become an eminent creator.

Enhancing one's chances in combinatorial creativity is not rocket science. Optimising that process is solely dependent on the human embodiment.

In fact, the only stable element in the equation of creativity seems to be the human embodiment: The creator.

THE DIFFICULTY TO EXPLAIN THE WHOLE PHENOMENON OF CREATIVITY COMES FROM THE DIFFICULTY TO MEASURE SOCIAL CONVENTIONS AND SOCIOCULTURAL ENVIRONMENT'S INFLUENCE ON THE PHENOMENON.

"Exploratory and transformational creativity can't be studied by neuroscientific studies, because they can't be located how they are 'neurally embodied' and there is no rational explanation how they relate to creative thinking:

My own view is that such explanations are likely to remain beyond us for very many years, perhaps even forever. That's not because I agree with those philosophers (e.g., McGinn, 1989, 1991) who argue that the explanation of high-level thought and consciousness is as far beyond the cognitive capacities of Homo sapiens as theoretical physics is beyond the capacities of squirrels and chimpanzees.

I believe that position to be unnecessarily defeatist. Nevertheless, there are some fundamental problems here, which can't be solved by (theory-free) correlative brain-imaging, or by reference, for example, to trial-and-error combinations and neural evolution (Chan-geux, 1994)." —Margaret A. Boden (Boden 2013, p. 12–13)

POETIC IMAGERY: THE COLLISION OF "ME-RELEVANT" EMOTIONAL AND COGNITIVE INFORMATION

> In **combinatorial creativity** the brain is generating unfamiliar combinations from the data that is personally familiar. The data is aligned with things that interest the person or that the person is concerned about. In combinatorial creativity the conceptual associations transforms the familiar data into novel solutions that can be surprising and unexpected, but can also lack the relevance or the value. Even the person oneself may not acknowledge if there is a relevance with the novel combination. (Boden 2013, p. 5–10; Dietrich 2004) (ibid.)

CREATIVE EXPLORATION AND *THE IMBOSSIBILIST SURPRISE* ARE DEFINED BY ZEITGEIST AND PLACE

> **Exploratory and transformational creativity** are defined by the concepts. Neuroscience is not studying these two types of creativity because they are involved e.g. with conventions of the sociocultural environment, and they are "grounded in some previously existing, and culturally accepted, structured style of thinking" (Boden 2013, p. 12). They are stylistic choices and like most of the styles, or conceptual spaces, that are explored in art and science they are hierarchical. (Boden 2013).
>
> ***Exploratory creativity*** benefits from the existing stylistic rules or conventions. When the concepts are used to generate novel, surprising structures (ideas or artifacts), their possibilities may or may not have been realised before the exploration took place (e.g. communication in complex social situations) (Boden 2013, p. 6).
>
> ***Transformational creativity*** may be "the most arresting and shocking of the three, wherein the novel idea appears to be not merely new, not even merely strange, but *impossible*. Seemingly, it simply could not have arisen—and yet it did. New idea arose because something was altered, the dimension of a style, or conceptual space, for example. The greater the alteration, and the more fundamental stylistic dimension concerned, the greater the shock of impossibilist surprise" (Boden 2013, p. 6–7).

This study explores all these three types of creativity. The concept of Metacognitive Process in Creative Self-Confidence investigates the causalities that each of these types may have on an individual, and whether the effect is positive (i.e. raises motivation and the feeling of competence, or negative (i.e. constraints or prevents an action).

What is metacognition?

Metacognition refers to "awareness and understanding of others', but mostly one's own learning or thought processes" (GOOGLE; MERRIAM WEBSTER; WIKIPEDIA).

Roughly put, it is about monitoring and becoming self-aware of one's own thinking and cognitive process in order to develop or improve them, and the ability to control these processes. Metacognition works in a similar way as mnemonics, and it is highly dependent on an individual. It is a personal process of one kind of growth, where an individual develops and forms their own tactics (RUNCO 2007, P. 322).

"Something should be said about lifelong creativity. After all, much of what is done in the education setting is intended to help students in the natural environment, and ideally it will also help them throughout their live. This is no easy task, given how quickly things are changing. Yet creativity is particularly useful in this regard. As Bruner (1972) said, 'we must prepare our students for the unforeseeable future.' They will be able to deal with the future if they develop creative skills." (RUNCO 2007, P. 207)

Runco (2007) directs attention to the complexity of creativity—that, because it is "a reflection of cognition, metacognition, attitude, motivation, affect, disposition, and temperament", it is about an individual and individual only. (…) Which part would react to enhancement? What could provide "the greatest return on the invested time and resources?" (RUNCO 2007, P. 320)

"In this light the most important creative skill may be meta-cognitive. This is literally "cognition about cognition", and includes self-reflection, self-monitoring, and conscious decisions about how to react to experience. Recall here the need for students to make choices and to exercise discretion about when to be original and when to conform. Meta-cognitive skills will be useful in the natural environment, through the life span, and allow individuals to invest in their creativity, battle routine, and choose mindfully, tactics for creative action." (RUNCO 2007, P. 207; P. 320)

In order to harness creativity on an individual level, ***the concept of Metacognitive Process In Creative Self-Confidence*** will explain *how* and *why* it is important to harness the individual's full creative capacity. The concept aims to motivate towards metacognitive process, and add personal value by explaining the causal benefits of the process. One aim is to give realisation about one's own intentions and goals, and provide awareness how even seemingly insignificant ordinary everyday ideas can grow into groundbreaking innovations.

However, these are part of the second and third steps of the metacognitive process. **This study aims to outline all three steps of the process and its heuristics but it mainly focuses on the first one**.

There are several reasons *why* everyone should improve their own creativity and one of the motivators that people may want to consider is the sociocultural aspect of enhancing creativity: Every individual has a possibility to have an impact on one's surroundings (even a major one).

This is the price that lies ahead, the end of a rainbow. I claim that at first an individual should acknowledge one's own creative potential before knowing exactly *how* to take the capacity in full use—and even more importantly; to get familiar with how to nurture one's own creativity.

People hold many misconceptions about creativity and even researchers debate about these topics, for instance; what or who is considered creative. However, creativity goes beyond vocation and social statuses, and it goes beyond age and personality.

The first step of metacognitive process in creative self-confidence is about questioning and expanding one's own thoughts, perception and conceptions about creativity. Metacognitive process' first step focuses on rather universal features of a person, the features that one most likely already possess and which are essential to understand for enhancing one's own creativity (i.e. creative thinking, production, and the outcome).

The core idea behind whole metacognitive process is highly dualistic. Its main purpose is to replace typical black-and-white thinking with grey areas: By offering the reader the familiar oppositions of optimistic and pessismistic worldviews, and replace them with a hint of meliorism. Main goal of the whole metacognitive process in boosting creative self-confidence is to strip down any excuses there may be why one does not act, and ask *why not* to create. The second and the third steps are designed to create more opportunities for an individual creations, and provide concrete tools for how to create—moreover, how to create ideal solutions.

The whole outline of the concept is based on selective human perception and the tendency to seek familiar patterns, which are explained in further chapters. I believe the familiar information often also *feels* more comfortable, which makes the data more relatable as well.

Our unrecognised biases can be like next-door neighbours or acquintances who we like to keep close, even though they would be our worst enemies. The first goal is to get to know them better and to become friends with them.

What is creative self-confidence?

I WOULD DESCRIBE THE IDEA OF CREATIVE SELF-CONFIDENCE LIKE THIS:

Creative self-confidence is a mix of resilience, serenity and stability, that comes from conscious and deliberate self-control over internal data; from the cognitive and emotional knowledge that one already possess, and from an acceptance that the external data is not solely in one's own hands.

It is a set of the feeling of competence, inner drive and tactics, and also an understanding the limitations and possibilities of a human mind, and sociocultural variables that can sabotage either one's creative self-confidence (by e.g. expectations that do not meet one's own capacity, goals or values) or one's creative action. If any of these constraints are overwhelming the person, there will be no action either.

Creative self-confidence is a mix of humbleness towards things one cannot have an impact on, and the pride and self-dignity with things that one can control.

Creative self-confidence is not only the "courage to create" (May 1975) (RUNCO 2007, P. 299), it is also the courage to execute and publish. It is the courage to admit shortcomings as a human being—as a creator, and an understanding that these shortcomings will most likely affect on the creation. Functional creativity requires ***a stable, driving force*** that—despite all of these shortcomings—keeps the person courageous enough, and on going, even if it means that the person needs to adjust, and try again if they did not succeed with the first try. Keep in mind, that human embodiment has been always adapting to its environment and in different situations rather well.

I consider that steady creative self-confidence is the driving force. That is required for any creative manifestation whether that is about artistic, scientific, or an everyday creativity like, for example, managing in complex social interactions or coping with prolonged stress.

Raising creative self-confidence in societal level aims for making more and more people daring to create, because without a voice there is no impact. However, if one is lacking the knowledge of tools and tactics–

without a game plan one's idea may never be heard. That is because anything that can go wrong will most likely go wrong, because there are no waterproof solutions. Yet, I claim that with the help of *appropriate* tactics, the likelihood to make an impact will grow—for the creator/s per se, and also for finding more ideal solutions. I also believe that with appropriate tactics the creative production can feel more effortfless.

This, the goal of the final step in metacognitive process and boosting creative self-confidence, aims to bring understanding on how important each individuals' uniquely built databases are. They hold our personally seasoned data that can contribute in finding ideal solutions when more and more great minds are brought together.

This concept was developed to reply for the demands of the modern era. Yet today it is popular to think that only a small elite of creatives are responsible for generating the next big C's.

The concept originates from finding tactics for an individual resilience: Individuals who are expected to meet the needs of current sociocultural environment where creativity is in high demand.

FUTURE DIRECTIONS OF THE CONCEPT

> Without a complete paradigm shift of creativity nor major changes in the sociocultural structures, this concept can be only seen as a strategy that can assist people to improve their own wellbeing. Maybe one day—since the sociocultural factors interact with an individual and vice versa—it can become a strategy in assisting societal wellbeing, too. More importantly, it must be pointed out that the concept is still very rough and it requires a through fact-check and further developments with the other professionals.

Heuristics of the Metacognitive Process in Creative Self-Confidence

In some extent thriving in creativity is completely dependent on an individual and individual alone. This is the societal awareness that should be arised in 21st century whether population's creative capacity wants to be harnessed. However, an individual would not have to conform with everything or drastically change anything about themselves.

I consider that it is the whole sociocultural environment that should acknowledge, provide an access, and take responsibility for creating an environment where an individual creative potential can thrive—an environment that acknowledges the limitations and possibilities of an individual embodiment, and what is required for creativity.

When I have been working with this study and with the topic creativity, it has really felt like an exploration. It felt like endlessly collecting these tiny little fractions of data—the pieces of information, that did not make any sense at first. Even today I do not understand the complete phenomenon of human creativity—I feel that I am actually far from understanding it. However, I begun to understand all fractals better (I think so, at least) when I associated them to gastronomy and cooking. That analogy has worked as my mnemonics alongside with this study, and with all the new things that I have learned during these years of exploring the phenomenon of human creativity.

I would like to emphasise that in this study as well; it became obvious from very early on how little I knew about creativity. What I did discover though, is that understanding something so complex (and yet natural) begins from a molecular level. Human creativity is an interplay of neurochemicals, an organic interplay of data that extends all the way to rather complex interaction with other fellow organisms—the sociocultural environment and history.

Moreover, because ***creativity*** is based on this continuous interplay of data, the only way to feed and grow creative insights into tangible creations or invisible ideas, is by increasing interaction and communication. We exhange data with each other and with our environment, and that allows tiny insights to *mature*.

However, communicating our ideas out loud (that once were just ordinary pieces of information) requires creative self-confidence. If we used to be hunter-gatherers in the human history, in the Age of Big Data we gather data and hunt killer ideas. However, because there is so much data that is available out there, with that amount there are pros and cons for creative thinking. If the quality of a solution wants to be improved also the quality of information must improve.

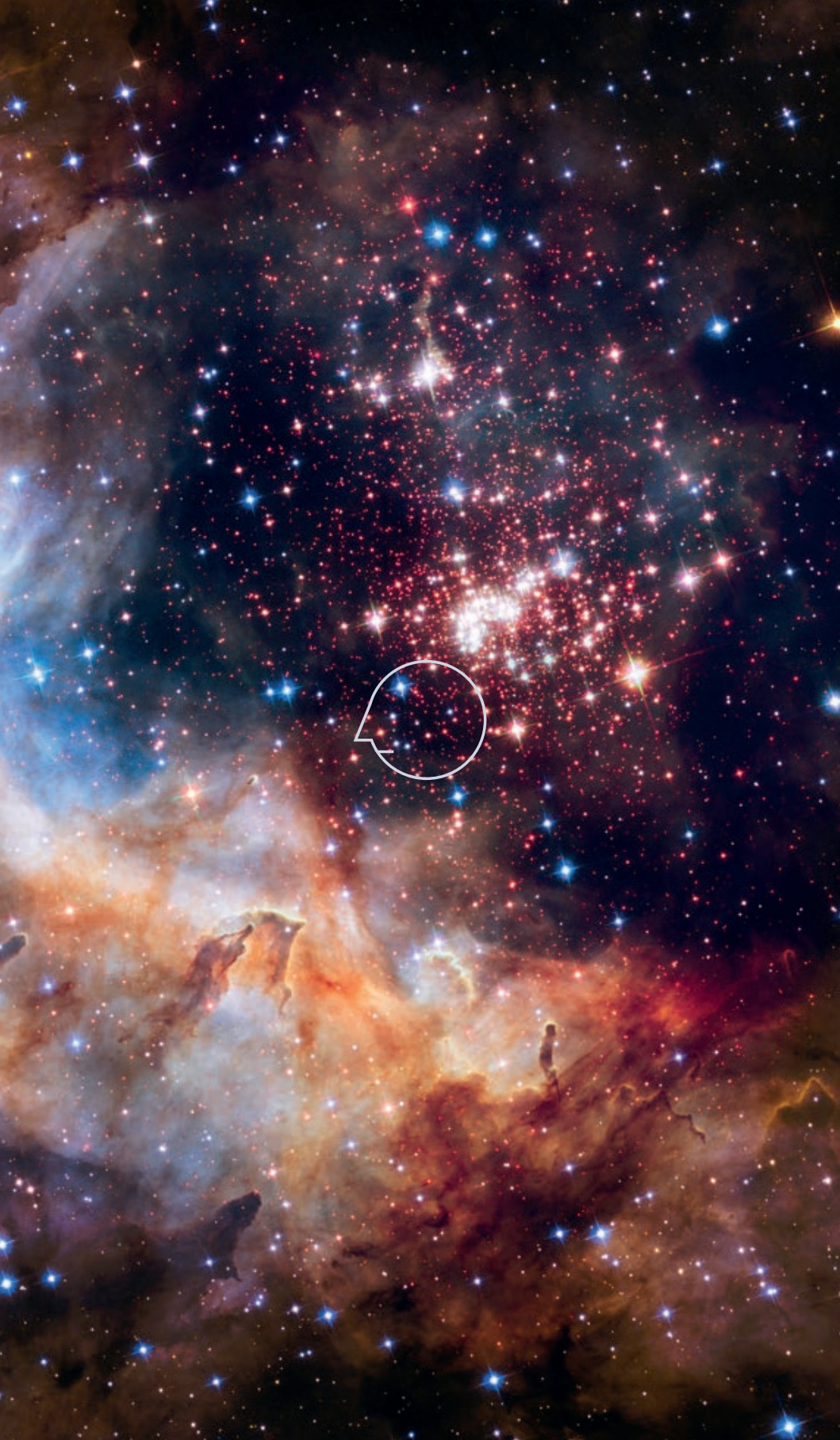
THERE IS ONLY ONE THUMB RULE IN THE METACOGNITIVE PROCESS OF CREATIVE SELF-CONFIDENCE
AND I BELIEVE IT ALSO ASSIST WITH UNDERSTANDING THE PHENOMENON OF HUMAN CREATIVITY—THAT IS:

"We are not individuals. No living thing is. Every organism is a symbiosis: An emeshed and embodied network of relationships."

— *MERLIN SHELDRAKE*

CREATIVE INSIGHT

Fundamental human information processing *or manipulation of the information?*



Human perception is limited

We are limited to perceive *all* the things that are constantly happening around us. When we gather the bits and pieces of information from the vastness of external data, we also gather data into the base of our knowledge. From that knowledge we construct ideas like who we might be, and what (we think) we know—that data defines the way how we perceive ourselves.

As a result, our own unique stories and the thoughts that we possess, have formed from these glimpses of data. They are the very same ingredients that are available and ready to be blended in creative thinking process. However, taking it into account that external stimuli are exactly the same for everyone, then what can explain why we tend not to think the same? What explains the differences of the creative products that our minds are generating? The focus must be directed to an individual and the various ways of *how external data is processed*. Each individual has a unique way of thinking because our life experiences are not the same.

What comes to creative thinking processes and generating insights, it is not enough to look only at how individuals processes information at the present moment, but also how they have processed the information previously. The data that establishes our personal histories used to be just pieces of information which then transformed into a highly personal and unique base of knowledge. Because that is also the base that holds the building blocks for creative insights, and the image of creative self, it is possible that some of the things *what we think we know* are not beneficial for creativity.

The collection of data that has been stored in the long-term database, affects on an individual's views and behaviour and how one processes information yet today. This long-term storage is endless. However, because we constantly interact with new data, the old information transforms, or even gets erased and replaced with the novel data.

Owens (2011) believes that the ability to be creative relies on three components that are ***perception***, ***thinking*** and ***expression***. All of these components come with limitations, but all of the shortcomings can be improved by an individual at least into some extent. Even more importantly, all of us have a similar kind of limitations.

External data is always manipulated by the unconscious processes of the brain.

External stimuli around us is collected, filtered, and gathered through human embodiment; our human senses and the brain. The brain extracts excess information and selects only the data that is vital and valuable for us. It is a shield that protects us from receiving too much information and we are limited to process *everything* from the vastness of data. This essential, but also deceptive phenomenon in human information processing is called ***selective perception***. (OWENS 2013) Yet, this phenomenon makes us who we are today and resonates who we used to be.

The carefully selected data that has been gathered and stored for long-term, explains why each emotion and every experience differs from person to person today. However, because the way we perceive things and how the brain evaluates data changes when we mature, selective human perception can also explain why someone lack creative self-confidence.

The data that the brain has gathered about creativity per se, can influence on whether the person acknowledges their creative potential. Some of the ingredients that can be poisonous for one's own creative self image, or they may sabotage the creative process. The personal idea about creativity per se, is just another piece of information that the brain has gathered, processed and recorded. The idea of creativity that each one of us likes to hold (tight), is a result of years and years collecting the data about what is creative and what is not. That data has established an individual base of knowledge about the phenomenon.

However, it is very likely that the information about creativity may have been distorted in the first place. That information that has been available for us to gather was also generated by the other people's limited perception, which can explain why there is so many rotten ingredients available about creativity. They can be considered rotten then when they make someone to doubt their own creative potential.

Creative thinking and expression can be trained through practice, but redirecting the way of how one perceives their own creative potential is not so simple because the phenomenon allows multiple interpretations, and none of them hold the ultimate truth. Owens (2011) crystallises that idea well: "Perception even at a very physical level, is always selective, limited, and, in a sense, biased." (OWENS 2011, P. 29)

Like any other data, the idea about one's own creative self has developed and changed its form during one's lifespan, which also means that it could not be recorded again (and again, and again) in a new way if some of the pieces of knowledge are poisonous for creative self-confidence. However, because most of these built-in processes in the brain occurs without an individual being aware of them, it is crucial to pay attention what kind of information about creativity you swallow. Every piece of knowledge that is out there, originates from someone else's unique database and that information is always seasoned with that person's biases.

COMMUNICATION GENERATES NEW EXTERNAL DATA

Those three components that Owens (2011) described; perception, thinking and expression, make a point why human language and communication can be considered creative even though the topic is widely debated by the researchers (Runco 2007; Sawyer 2006) (ibid.).

We learn and develop language through human senses. We learn how to recognise different nuances and tones of voice, and we begin to understand them better and better as we grow up. All that information is stored in the brain. The brain transforms that data into an expression of thoughts—human communication.

We tend to adapt in different social settings (p. 107), and throughout the years we have learned what should be communicated out loud and what should be left unsaid. However, in these environments we simultaneously exchange the pieces of information.

We generate new data through communication, and that data has been affected by our own unique base of knowledge. Verbalised and communicated information reflects the things that we already had in store. Moreover, the new data that our mind has generated becomes available for someone else to pick up who then can turn it into yet again novel combination—a personal interpretation of the data.

For example every line, and every page of this thesis has not existed before, and it is a novel combination of information that was available to gather. It is a new piece of external data that is available for the others to collect. However, because this thesis has also been generated by a human being with limited perception and a unique database, the information is also at least somewhat seasoned.

Hence, whether the quality of this thesis is "high" or "low" is not completely in the hands of the author, who has produced this piece of information to be part of the vastness of external stimuli. The final evaluator for that matter is the recipient.

"Changing peoples' minds first requires them to appreciate what they don't know." —NICHOLAS LIGHT

The awareness of unconscious processes can assist with recognising biases, and to have a control over the received information.

Even though we all perceive the surrounding world differently, there are similarities with *how* the external information is processed in the brain. We share common pathways in the brain that are responsible for processing information coming from outside and arising from within. For centuries there has been a lot of romantic mystification around creativity, and the most misunderstood part is that only small part of the society would possess a creative superpower to come up with new ideas—but we all share a similar brain structure that enables that ability. (SAWYER 2006; VARTANIAN ET AL. 2013) (IBID.)

The structure of the brain is quite logical if evolution is taken into account. The "animal" brain can be considered to be parts that are the most protected areas deep inside the head. That is the command centre for all vital bodily functions, for example. The other regions that are around the so-called primitive areas, are responsible for higher thinking skills and decision making. The command centre does not have direct pathways to these sophisticated areas, which can affect on the neural interplay. The brain functions as a unit, but some of the areas can become more difficult to access if the some area is more active than the other.

> The brain works like time. It is limited. The time you spend on something, is always away from something else. When some of the areas in the brain are more active, the other areas are less active. (MY MNEMONICS)

I believe that at least a superficial understanding about the unconscious processes can bring a feeling of self-control in the process of generating creative insights and for the creative production. I argue that no(t even the most creative) individual is always confident in what they do, and that self-doubt can arise a question whether they are creative enough.

Also for the sake of high-quality creative production, it is rather essential to be aware when to stop, or when it is an optimal moment to carry on with the production. The body sends signals when the brain's sophisticated areas are not fully functioning, and if they are not it means that the quality of the creative output will suffer too. Moreover, we are all driven by these features in the brain that are highly difficult to tame. The unconscious processes are not only directing our perception, but they are also responsible for the decisions that rule our behaviour and actions.

THE FEELING OF CONTROL IN THE CREATIVE PRODUCTION

> "Dacey and Lennon differentiated two kinds of self-control: The first type is 'the immediate control that we use in our everyday lives at any given moment, such as conforming to appropriate forms of behaviour, sticking to a routine, or following a schedule to meet a deadline. (...) The second type of self-control requires insight, faith, and a vision of the future. (...) It is motivated by passion, self-confidence, and a sense of self-worth (pp. 120–121)." (Runco 2007, p. 289).
>
> This same idea can be expanded to consider the enhancements in creative self-confidence: From bringing awareness to the negative thoughts, that can make one doubt their creative abilities (i.e. the feeling of incompetence) and even lead one to think that they are not creative enough (i.e. understating one's own creative capacity), can assist with creative production by bringing more self-control in the process.
>
> I believe that more than often e.g. the feeling of incompetence can arise from completely other factors than the person's creative capabilities. For example if one does not recognise the heightened levels of stress that has an affect on the performance and quality, the production itself can feel like a struggle. From paying attention to one's own embodiment can bring a feeling of self-control to the process, because at the end of the day, the body and the brain are the only tools for creative thinking and the production.
>
> That self-control is useful for regulating emotions and negative thoughts, that are essential for carrying creative production to the finish line. **However, if a person does not have a clue what is against them, or what it is exactly that they would need to take under the control, then how could they ever have a chance to tame it?**

Carl Jung has stated "**until you make the unconscious conscious, it will direct your life and you will call it fate.**". Unconscious processes have a dominant control over human behaviour and actions. The data that is constantly brewing up in unconscious mind, effects also on how we react when we encounter a task that would require more calm mindset and flexible thinking.

There is a lot of information that has been recorded deep into the unconscious database through personal **experiences** and **emotions**. Part of the database is coded by human heredity that holds thousands of years old knowledge. This is the data that the brain has swallowed, and it determines how we react on the novel information as well.

A CORRELATION BETWEEN THE UNCONSCIOUS PROCESSES AND CREATIVE THINKING

Sometimes the unconscious mind arises thoughts into the awareness. It happens unwillingly and effortlessly, even though one may not be able to explain or put a finger on "why" or "how" that idea arouse in the first place. This feature is especially handy for generating creative insights. However, the brain is a bit outdated and bittersweetly flawed organism, and sometimes the unconscious processes can also harm the creative process.

Sometimes the unconscious mind arises thoughts or ignites reactions that are not beneficial for creativity. The higher-thinking skills that would be required for insightful information processing, suffer from the alertness in the body. This alertness can decrease the ability to evaluate creative insights, for example. An unconscious response that occurs in the brain via negative or excess information, physiological arousal, or elevated emotions, activates the ***amygdala*** in the brain. Amygdala communicates with other parts in the ***limbic system*** that are responsible for e.g. regulating emotions. (RUNCO 2007; SEPPÄLÄ 2016) (IBID.)

THE CONSTRUCTIVIST THEORIES OF KNOWLEDGE

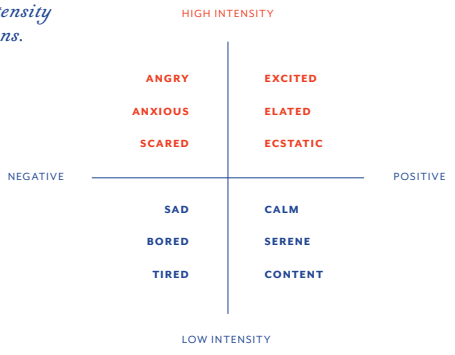
"Stress is a reaction, a failure to cope. (...) Cognitive processes that moderate between objective events and the interpretation of stress may be associated with the constructive processes that allow creative insights."

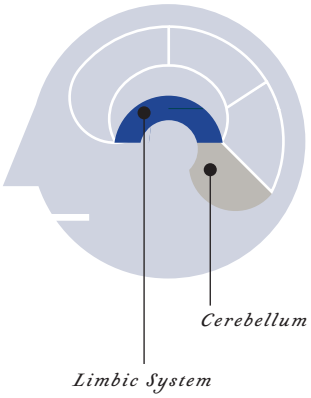
(Runco 2007, p. 129)

The stress response ignites in the body when the adrenaline and cortisol levels arise in the brain. The brain goes to an autopilot, and we become driven by animal instincts. We either fight or flight. Moreover, it is not only the short bursts of stressors that can make us alert, but also ***prolonged stress*** harms higher mental processes. (HANSON 2013; SEPPÄLÄ 2016) (IBID.) Hanson (2013) argues that stress can even disturb the activity of genes and DNA (p. 30–31). Seppälä (2016) states that we are often also praising high-intensity emotions over low-intensity emotions, even though elevated reactions would not be beneficial for higher-thinking skills.

The definition of high-intensity and low-intensity emotions.

Adapted from Seppälä 2016, p. 71





The "animal" brain is hardwired for detecting dangers from the surroundings, and it adjusts the unconscious processes according to the threat.

Our animal instincts are still highly sensitive to negative information. Also, the brain tends to focus on negative thoughts more than the positive ones. Hanson calls this built-in feature ***negativity bias***. Negativity bias has been hypothesised to be an evolutionarily adaptive feature that has been essential for survival. However, as stated before, the brain is dated and this tendency is no longer as needed as it has been to our ancestors. Moreover, negativity can often get on our way. (HANSON 2013; SEPPÄLÄ 2016) (IBID.)

Negativity bias makes the brain cling to, and dwell on negative things. Instead of seeing opportunities, we only tend to see threats and we can even overestimate them. The tendency to scan negative things makes the brain to react, and negative information is effectively recorded in the neural system. From that system the negative "memory" can be retrieved back to awareness even unwillingly, or even though one could not point out for what exactly they are afraid of. (HANSON 2013)

The more often this happening occurs, and without the proper tools to deal with that piece of information, the stronger the neural pathway gets. The brain learns from repetitive information. However, there is a bright side. Because the brain is like plastic, and its neural network is malleable, from bringing awareness to the thoughts and reactions that the unconscious mind is trying to feed us can be taken under control by conscious practices—hence, *repetitive* practices.

ANIMAL-LIKE ALERTNESS ON NOVEL, UNEXPECTED THINGS

In addition to negative stimuli, the brain happens to be also really good at noticing and learning from novel things. The brain detects especially well all the **unexpected things** from the surroundings. The scapegoat for this dated feature might be the little brain, ***cerebellum***.

Cerebellum is not only involved in "the processing of motoric information, language and ideas, [but] it also may play a role when the individual is faced with novelty (…) [this tendency] seems to be similar to *anticipation* and *expectation* (Leiner et al. 1986; Vandervert et al. 1993)." (RUNCO 2007, P. 88; P. 90)

> "'We don't know exactly what the cerebellum is doing, but whatever it's doing, it's doing a lot of it.' The cerebellum is only 10% of brain volume but holds over 50% of the brain's total neurons." —CHRISTOPHER BERGLAND, PSYCHOLOGY TODAY, 2015

When the brain begins to process sudden, surprising external data, the cerebellum gives the first pre-evaluation of that data. It evaluates if it matters to us and if we need to take any actions to the sudden information. No matter how well the rest of the brain would try to filter the excess external information that is not essential for us, the primitive features yet guarantee that at least the attention is always drawn into:

rapid changes in the environment 1

and negative stimuli

or anything, that can possibly be a threat to our living bodies. That is main purpose of the brain; to protect us. However, these essential features can not only sabotage the creative self-confidence, but also the actual creative production.

Because of how the neural pathways are built in the brain, when amygdala is on high alert, the other parts becomes less active. These other parts we would need to retain control and stay cool as a cucumber. When feelings boil over, an internal awareness and self-control diminishes, and elevated stress levels makes the mind feel fuzzy and creative thinking becomes more difficult. That is the sign that the unconscious processes run the show—not the creator per se. (SEPPÄLÄ 2016; RUNCO 2007)

p. 78 *"Creative people never tend to finish for what they have started"*

On the other hand, even though the built-in filters in the brain are essential and without them the excess stimuli would drain us, it can also lead into situations where **"we [either] fail to see what is right in front of us, or we go too far in limiting where we look"** (OWENS 2011, P. 30). These tendencies vary from person to person, and this when the individual perception steps in again.

First of all, the bits and pieces of information that the brain has gathered from the vastness of external data, is always ***simplified information*** that one possesses. *What kind* of simplified data the person has in store, depends on how sensitive the person's senses are. ***Responsiveness*** is one of the keys to explain why we experience and perceive the world differently, and why our individually constructed universes differ from one another. (OWENS 2011; HANSON 2013) (IBID.)

Perception is always selective, and
the sensitivity to external stimuli;
responsiveness, can direct perception.

The level of responsiveness is not the same for every person. For example, individuals *who are not wearing their blindfolds* tend to be more sensitive to stimuli. They observe and notice things in more detailed manner. Elaine Aron believes that evolution may explain why some people are more sensitive than others. In her book "Erityisherkkä ihminen" (transl. Highly Sensitive Person, 1996) she argues that the people who were more responsive to external cues and stimuli may have been the ones, whose role was to warn others about the possible dangers. That they sensed the nuances and changes in the environment more carefully, and used this information to predict that something can be about to happen. (ARON 2017)

Haziness, or "the brain fog" can occur from an overstimulation of senses.

In that sense ***sensitivity*** can be beneficial. It allows one to carefully gather more information from the surrounding world. However, on the other hand, we are not living alongside with wild animals anymore. In the world today the "wild beasts" are the stressors that overstimulate our senses. For example if an individual indulges *too* much information, it can lead to similar high alert state of the body like the fight-or-flight response does. Therefore sensitivity, which is claimed to be one of core characteristics in creativity, can make an individual more prone to stress. The stress response distracts both, the attention and the ability to focus, that would be required to finish the task at hand. (ARON 2017; RUNCO 2007)

Yet, most of us go blindfolded and the
things that have become familiar to us,
stay unnoticed. (Hanson 2013; Seppälä 2016) (ibid.)

Information is processed through our living embodiment. Therefore we are never exactly the same, nor are our experiences. They are not perceived the same.

By definition perception is an interpretation of the individual experience (Runco 2007, p. 129). Heightened stress levels can distort the perception. (Runco 2007)

Yet, all the experiences and emotions that we have ever had is personally gathered information, that constructs our unique perceptions. These pieces of information are readily available in generating creative insights as well.

The neurobiological studies on creativity are still in their infancy.

In his book, Runco explains how creative personality is not about one single trait but, instead, creative personalities are more like constellations. If personality is a constellation of different traits, then the brain itself is the universe—a star cluster at the very least.

> The communicational network in the brain is an ultrafast gateway of 80–150 billion neurones that transmits information through synapses (Hanson 2013; Sawyer 2011) (ibid.).

Up to date we know that all psychological functions are based on different activities in the neural system. Individual's experiences are the results of stimulation coming from outside, stimulation of which activates the brain through the body; eyes, ears, tongue, touch and so forth.

Senses arise both unconscious and conscious thoughts (e.g. wills and emotions), that creates an ever-changing network within an individual. These ***experiences*** continuously reforms and reshapes the existing connections in the neural system. The more powerful, long-lasting, or repeating the experience has been to an individual, the more permanent connection it has established in one's brain (HANSON 2013, P. 29–30).

How one may feel at each moment, or during an experience, has a lot to do with what kind of connections there has been previously established in the neural system. In addition, also the current ***mood*** develops effectively one's neural structures by either accelerating the formation of new connections in the brain or strengthening the old existing connections.

Explaining the matter of emotions or experiences for cognition and creativity requires looking at the big picture, the body, but I believe that it is crucial to understand the tiny bits of the body too—the very basic human senses, for example.

Please note that the studies on the causal relationship between the brain and the body are only very recent, and it is yet unclear how exactly the communication between these two works. For example, it is unclear if particular bodily reactions have its origins in the brain or the other way around; if, for example, particular inflammation in the body—or even just a bad diet—causes reactions in the brain.

“The imperfect, unbalanced display of human creativity is precisely what creativity is” —DAHLIA W. ZAIDEL

Even though the statement that “human creativity is just data” may sound like an understatement, it is actually the opposite: It is a glorification of the beautifully flawed human embodiment.

The system that we carry between our shoulders is highly intelligent and developed, even though it is not perfect at all. It looks after us when the conscious mind is making bad decisions. It is able to generate “poetic imagery” from the bits and pieces of data, that one’s limited perception has selected and that the brain has then gathered together. The human embodiment per se, can transform simple fractions of data into invisible ideas and tangible objects.

In sum, I believe that explaining human creativity to a wider audience should begin from a molecular level. Explaining creativity should always start from giving an understanding that the *only* tool that we need and the only tool we have for creativity is the human embodiment.

However, ***the human embodiment is not a machine*** that would be able to generate creative thoughts eight straight, five days in a row like the steam machines were during the Industrial Revolution, and I think that issue has not been addressed in the modern world where creativity is in high demand at the work places and in every day life.

Because ***there is nothing ultrahuman about creativity*** and it does not occur from pushing some magic button on and off—the only tool for creativity is an individual per se—I believe that in the 21st century society, the knowledge of how one can *nurture* their creative built-in ability, would be crucial in harnessing the whole creative capacity of the population.

The creator is the source of creativity,
when all the other factors involved with the
phenomenon are changing their form.

Insightful information processing

> "'Creativity is a fundamental activity of human information processing (M. A. Boden, 1998). It is generally agreed to produce work that is both novel (i.e. original, unexpected) and appropriate (i.e. useful, adaptive concerning task constraints)' (Sternberg & Lubart, 1999, p. 3). (…) By definition, creative insights occur in consciousness." (DIETRICH 2004, P. 1011)

The elements that are involved with insightful information processing are located in the neural system, and each of the elements have a particular task. It can be quite easy to understand how information "flows" in the brain, but behind the process there is an intelligent, complex system where tiny little particles are involved with the process all the time.

This molecular level is a relevant approach to human creativity, and it has also interested the researchers. At its very core, the human brain (and the whole body) is a living organism that is constantly influenced by other rich and complicated organisms. In his book When Breath Becomes Air (2016), the author and neurosurgeon Paul Kalanithi (1979–2015) put this idea very well.

In the chapter where he is describing his own career choice and the process of writing, he writes: **"…the mind was simply the operation of the brain, an idea that struck me with force; it startled my naive understanding of the world. Of course, it must be true—what were our brains doing, otherwise? *Though we had free will, we were also biological organisms*—the brain was an organ, subject to all *the laws of physics*, too! Literature provided a rich account of human meaning; the brain, then, was the machinery that somehow enabled it."** (TRANS. KALANITHI 2016, HENKÄYS ON ILMAA VAIN; GOOGLE BOOKS).

However, the laws of creativity are yet partly unknown.

Thus far the field of neuroscientific has been focusing on the brain activity that shows changes when creative behaviour occurs. Researchers have located particular areas in the brain that are involved in creative tasks. The changes that occur during creative thinking, and at the moment of insight, are measured by their computational qualities and with the neuroimaging techniques. However, even though researchers have the tools to measure

these electrical and chemical changes when the moment of insight occurs, the detailed knowledge about this neural activity is yet unsolved. (RUNCO 2007; VARTANIAN ET AL. 2013) (IBID.)

> "The 'mystery' of creativity, as regards neuroscience, lies not [only] in its unpredictability but [also] its computational variety." (BODEN 2013, P. 4–5).

Up to date, neuroscience can not explain that which brain cells are particularly involved in insightful thinking. We do not know that which neurones are responsible for creativity nor what they are doing when creativity takes place. The active cells and circuits seem not to follow any rules nor patterns (i.e. there is computational variety on cellular level). This makes measuring the brain functions and processes even more complex and difficult than it already is. (BODEN 2013)

However, neuroscientific studies seem to agree with one thing. For example Dietrich (2004), Boden (2013), and Zaidel (2013) have all pointed out that "there is not just one single neuronal circuitry for creativity, (…) it is rather a complex interplay of neural factors that contributes to creativity, and its components are yet to be deciphered." (ZAIDEL 2013, P. 143–144).

Zaidel continues:

> "It would be neat and convenient if we could pinpoint the process that gives rise to creativity, but the brain—as many other biological, chemical, and physical systems—does not follow regular, orderly rules. In sum, it may be that the imperfect, unbalanced display of human creativity is precisely what creativity is: a particular yet irregular neuronal process reflecting deviations in the steady pattern of neuronal activity." — Dahlia W. Zaidel (ZAIDEL 2013, P. 144)

Without a doubt there are exciting times ahead what comes to creativity research, and its on-going journey that will allow the yet unknown phenomenon of creativity to become hardcore science at some point in the future. Furthermore, as long as the last bits of information in human creativity are missing, the human creativity will remain irreplaceable. If someone wants to know that for how long we might have to wait for the moment that we can even consider "replacing human creativity", the answer would be; "for quite some time". Morever, replacing human creativity is not the goal of the creativity researchers.

Considering that the field of neuroscience itself is rather new field of study and it is developing, it is quite evident that at some point though nut of "the patterns of creative-neurones" will be cracked, too. There are many things about the brain that we do not know, and the neuroscientists are making progress. For example, the latest rather big finding about the neural system were the rose hip neurones: *The new kind of brain cells, "rosehip neurones" were reported in August 2018, and they may provide an explanation for particular mental illnesses.*

We may have more clear ideas about the mental illnesses since they have been studied and theorised for quite some time. They have a frame that they are studied in, and the theories in psychopathology has been able to provide a direction for neuroscientific studies—it has provided an understanding of what to look for.

Compared to psychopathology, with creativity the direction of studies is rather unclear, or inconsistent. We do not have a consistent definition for creativity, even though it has been theorised for quite some time as well. There is a lot of diversity with these theories, and at first we may need to agree what creativity is before we even know what to look for. In addition, the unpredictable nature of creativity, and the boundaries of how to measure it, slows the researchers down.

However, a little delay can be a positive thing as well. I believe that when the exact neural behaviour in creativity will be mapped—meaning, that human creativity is computed according to the neural level (and that is sooner than later)—then it could also be turned into an algorithm as well. If that happens, "creativity" could become an add-on feature in artificial intelligence. Even though that would not "replace human creativity" completely, I believe that defining creativity would become even more difficult at that point.

I am actually having an on-going bet about this topic; "Can creativity be turned into an algorithm", with an algorithm-oriented mathematician who works in New York. We both estimated that creativity will be turned into an algorithm in five years. However, we might have a bit different views about how exactly that would "replace" human creativity. For example, I do think that AI could improve the evaluation of solutions, for example, but it is unlikely that it would replace human creativity per se.

THE MATTER OF RELEVANCE: HOW DOES THE MIND EVALUATE ARISING THOUGHTS?

"An insightful computational approach to relevance suggests that we have evolved an involuntary, and exceptionless, principle of communication based on a cost-benefit analysis, weighing effort against effect. Psychological mechanisms must be evolved for recognising relevance that catches our attention: our sensory systems and memory.

The analysis of relevance implies that **our understanding typically depends on associative, nonlogical guessing that is constrained by what we take to be relevant**, rather than GOFAI (Good Old-Fashioned Artificial Intelligence), an assumption that deliberate reasoning is required for spontaneous interpretation" (Boden 2013, p. 10–11).

Human creativity cannot be replaced any time soon.

One of the most respected researchers from the field, Margaret A. Boden, sheds a bit of light on *the goals of neuroscientific studies in creativity*. Instead that the purpose would be to replace human creativity, she explains that the "(…) aim is not to predict individual events: we don't want to predict the movements of each grain of sand on the beach. **The common view that a science of creativity could predict every detail of creative thought, thus making human artists and scientists (and everyday punsters…) redundant, is mistaken.**" (BODEN 2013, P. 4–5) Instead, the goal of creativity research is rather to "explain all (…) forms of creativity, to move beyond creativity myths (…), and to develop a science of human innovation (…) that provides ***a consistent theory of creativity***." (SAWYER 2006; SAWYER 2011) (VARTANIAN ET AL. 2013) (IBID.)

NEURAL PATHWAYS CAN BE STRENGTHENED BY TRAINING

> The researchers have acknowledged that if creativity is defined as a process of divergent thinking then that particular process can indeed be measured and the skill can be probably intentionally enhanced by training. However, please note that creativity is not only divergent thinking.
>
> The matter of "creative training" has become obvious ina few of the studies that have been conducted thus far. For example, Andrey Rodionov (2019) has investigated and measured the performance in different creative tasks with the sample groups that involved both, trained actors and non-actors. Rodionov's findings suggest that creative training does matter: Even though the tasks that were given to each participant were the same for everyone, the trained actors performed e.g. faster and more accurately.

One point of view on creativity distinguishes ordinary thinking from creative thinking by the moment of insight. Moreover, creative insights are measurable data.

In 2004 Arne Dietrich published a study "The cognitive neuroscience of creativity". In this study Dietrich investigated the neural circuits that are linked to specific higher brain functions, and especially with insightful information processing. According to his conclusions the significance of

conscious deliberation can not be dismissed, and creative insights do not "just happen". Creative insight occurs in the conscious parts of the brain which are also responsible for social judgment, for example.

The reason why this particular study was so remarkable, is that it demonstrated how normative information processing can arise a creative insight. There are four ways to arise insights; four ways that are each mediating by a distinctive neural circuit in the brain. From very early on of this study and during the discourse analysis, the thing that became rather obvious was that Boden's views and Dietrich's pioneering study have influenced on the way how other neuroscientific studies in creativity are directed up to date. Runco (2007) also states that Dietrich's ideas about the brain function and structure fit together with various cognitive theories of creativity (RUNCO 2007, P. 83).

Dietrich's study (2004) pointed out that insightful thinking is simply originating from ordinary mental processes, and that the "(…) neural circuits that process specific information to yield noncreative combinations of specific information *are the same* neural circuits that generate creative or novel combinations of that information" (DIETRICH 2004, P. 1011).

The study also points out the significant role of the prefrontal cortex in creative thinking. The fundamental thinking processes that combines normative information and can arise creative insights, acquires conscious deliberation that occurs in the frontal lobe. The frontal lobe processes that information, and can transform the data into appropriate, valuable insights.

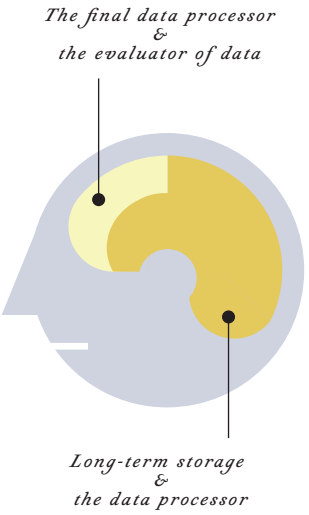
Dietrich (2004) argues that "creativity requires cognitive abilities such as working memory, sustained attention, cognitive flexibility [e.g. divergent thinking], and judgment of propriety, that are typically ascribed to the prefrontal cortex." (DIETRICH 2004, P. 1014). Also what can be concluded from Dietrich's study is that:

Creative insights are not "lucky coincidences". Creativity is insightful information processing that is dependent on both processing modes; spontaneous and deliberate. The form and the quality of creative insight is dependent on the modes of processing, and also on an individual's cognitive and emotional knowledge.

So what differentiates creative thinking from ordinary processes is the moment of insight, but there is nothing magical or superhuman about it. Creative insights occur in the consciousness; in the frontal lobe, and creative thinking may indeed be executed under deliberate control. In opposition to popular beliefs, any part of creativity is not a mystical

nor divine phenomenon that would "just happen", or stem solely from an inner pain of the artist for example. High-quality creative thinking and expression requires cognitive abilities and rationality as well.

What works as a data source for insight, is the storage of recorded information in the long-term memory. That storage and the processors of normative information can be located to the other areas in the brain, that are separated from the frontal lobe by a central fissure.



Dietrich (2004) argued that insightful creative thinking stems from two domains of knowledge: from emotional or cognitive contents of which both, can be processed in two ways: deliberately or spontaneously. Databases and the processing modes can be tracked in the brain by their four different and distinctive routes (i.e. neural circuits). However, the data always ends up in one place: to working memory buffer of the prefrontal cortex that holds the content in consciousness for further actions. (DIETRICH 2004) Furthermore, he argued that:

> "Given that perseveration to old information is anathema to creative thinking, it is evident that a fully operational prefrontal cortex enables cognition that is necessary for creative ability." (DIETRICH 2004, P. 1014)

Dietrich—who in his own words "(...) gave early promise of being nothing special whatsoever. As a child, he was annoyingly hyperactive and exceptionally stubborn, so some people predicted a career as a clown while others foresaw an early death", and who is now "a tour guide into the bizarre world of brain cells and human behaviour" and the professor of cognitive neuroscience (Dietrich 2019)—was the author who completely changed my own views on creativity.

I bumped into Dietrich's groundbreaking study in 2015, right after I had started my studies in Aalto University. Until that I had read who-knows-how-many articles and books about creativity for about a year or two. For years, I had been contemplating the question whether I am creative or not, which mainly stemmed from the feeling of constant incompetence, even though I simultaneously knew that I was a trained "creative". None of the things that I had read before were not exactly convincing me, nor raising my creative self-confidence as a professional designer.

Since 2015, since I had found Dietrich's study and from the further investigations on the topic, I have had several insights that have not only improved my own work but also improved recognising when my fellow "creatives" are not doing so well. However, back in 2015 I had no idea how the brain works, and had limited knowledge what insightful thinking would require from the creator. Until that point I had been "just" generating ideas after another without really paying attention on *how* I am capable of doing that. Diving into the deep end with the phenomenon of creativity was an act, that made me discover so many new pieces of information—pieces that enabled me to give away the older data, that I had gathered for years and years about creativity per se.

It inspired me to translate my own learning experience into metacognitive process in creative self-confidence in so, that the insights that I have had would be available and visible for others to reach as well. In the end, I think that is exactly what "inspiration" is: **It is something or someone that providing you a new piece of data that fulfils the older or half-baked ideas that you have had before**. That is what is also great about the Big Data Age: All the existing knowledge that may be missing from one's long-term database can be reached within a matter of seconds—but only if you know what to look for. And only, if you are paying attention on the quality of information that is fed to you.

Having personal insights about creativity itself, requires giving up on something that you have always "known" and replacing or fulfilling that old data with new pieces of information. There is an endless amount of available data about creativity and if one does not know what to look for, it is more than likely that the person will end up finding articles and self-help tips that are either vague or even erroneous. Some of the information that is available can be extremely poisonous for creative self-confidence, and it can only support persistent misconceptions about creativity—it is old information.

If a person holds on to that old data, it is anathema for having personal insights about one's own creative abilities. Also, if one is not able to evaluate that information that is available it can lead to wrong interpretations about creativity.

For example, many tips about enhancing creativity suggest that one should *"do something more"*, even though creativity benefits from doing nothing. It has been suggested that for example travelling, taking risks, and trying new things will increase creative abilities.

These tips are not completely untrue, but none of them supports the evaluation of data because they make us live on the edge instead of calming the mind down. "Procrastination" is not really a popular habit in today's work life, but yet, *incubation* can improve the process in evaluating creative insights. Moreover, incubation lets the new data to sink in.

However, what comes to this thesis is that in 2015 I had no clue, how deep rabbit hole I was about to jump in. I had no idea about how much data about creativity I would be able to find that I had not known before. Today I have a better understanding what to look for, but what comes down to human creativity the vastness and the diversity of information is too much for one person to evaluate. Furthermore, new pieces of data keeps on appearing all the time.

Because creativity is an on-going research, and it appears to develop according to the Zeitgeist and together with technological advancements, is why I try to present my biased knowledge bases as transparently as I can. That knowledge can, and most likely will, become "old information" about creativity in a matter of years. At this point human creativity can be seen a never-ending exploration, because we are still missing the science of creativity.

Furthermore, **this study has been heavily influenced by the thoughts and theories, and the empirical studies generated by great minds of Margaret A. Boden and Arne Dietrich, and numerous other researchers who are proving the latest information about how human creativity works.** The information that they have provided for others to see, and for me to find, has been evaluated by my mind and they have became the inspirational sources of this study. In addition to these people above, who are mainly working in the field of neuroscience, the person who has affected on my thinking about the possibilities of collective creativity is psychologist Keith Sawyer.

All the knowledge that I have gained thus far has generated new combinations; the creative insights, that I shamelessly put out there by publishing this thesis. They are influenced by my melioristic beliefs, by the perception that I possess, and by the core idea how "little strokes fell great oaks". Those insights are included in this study because they themselves reveal concretely that how far an individual mind can go, during five years of exploring the phenomenon of creativity.

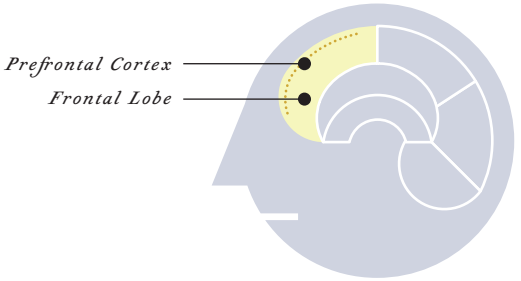
I want to emphasise that these random ideas are generated under deliberate control. However, it is more than likely that they include errors. I must have missed some important pieces of information, the law of physics, because unfortunately I have not been formally educated in neurobiology, and I also failed the exam in short maths in high school. However, they are published to make a point that if ideas are not communicated, they can never fulfil someone else's half-baked idea—they are no-ideas. I believe that no-idea is worse than "wrong" idea. **You can learn more about my insights on p. 124.**

Now it has been almost five years that I have been almost obsessed with observing how creativity manifests in other people around me, and how it manifests in me. A bit sentimental side note that I want to conclude here is that during these five years, I have became even more fascinated by the human mind, and I am utterly humbled by the abilities the human embodiment. Yet, there is so much that I do not know about creativity so the exploration must to keep on going.

The role of conscious deliberation in creative, insightful thinking

Creative insights do not appear from the thin air. There is a lot of data that one has stored in the long-term storage during one's lifespan, and that is readily available for further processing. That data would just need to be retrieved back to the conscious mind, and the frontal lobe assists with that.

Dietrich (2004) is not suggesting that the prefrontal cortex would be the "seat of creativity" (DIETRICH 2004, P. 1011) but the role of prefrontal cortex in creative thinking *is* significant, because it allows ***the maturation of information*** that is bubbling under in one's mind. Prefrontal cortex has many functions, and in information processing its first role is to pre-evaluate and evaluate the content that has arouse to conscious awareness. It makes judgments of the information, sustains attention, and continuously "buffers" the data in working memory, and finally, the prefrontal cortex assists with implementing the idea by relating insights to possible goals or subgoals of a thought. (DIETRICH 2004; RUNCO 2007) (IBID.)



"Insights may seem to be sudden and quick, but actually there is likely to be a protracted development to each (Gruber 1988). They feel sudden because they pop into consciousness, but they have been germinating below the level of consciousness for some time. That germination usually involves searches, and perhaps even restructuring of one's knowledge base, and the acquisition of the necessary knowledge, like the incubation and insight process, can take quite some time. (…) for the person to master the knowledge necessary to understand the gaps and nuances of a field [e.g. "10-year rule"] (Hayes 1989, Simon 1988)." (RUNCO 2007, P. 295)

PREFRONTAL CORTEX AND CREATIVITY

"Prefrontal cortex plays a significant role in creative thinking". "In the most recent studies prefrontal cortex has received more attention than any other part of the brain. **It is responsible for higher cognitive functions, including attention, perception, memory, arousal, self-reflection, and perhaps consciousness itself** (Dietrich, in cited Vandervert et al., in press, 2004).

It may play a role in social decisions, temporal integration, and abstract thinking as well (Damasio 1994). According to several studies with various methodologies (rCBF, for example), **happiness and relaxation increased cerebral blood flow and the activity in the frontal cortex** compared to "work phase"." (Dietrich 2004; Runco 2007) (ibid.)

"Dietrich predicted the association between mood and 'hyperactivity' in the VMPFC region but hypoactivity in the DLPFC region, which are both related to different kinds of thinking, different forms of creativity [i.e. Four types of insigh]. Spontaneous creativity is associated with activation among temporal-occipital-parietal lobes [TOP areas], and activating dorsolateral prefrontal cortex [i.e. DLPFC] likely supports the deliberate creativity [e.g. the working phase]" (Runco 2007, p. 82).

PREFRONTAL CORTEX IS NOT ONE UNIT WITH MERELY ONE FUNCTION

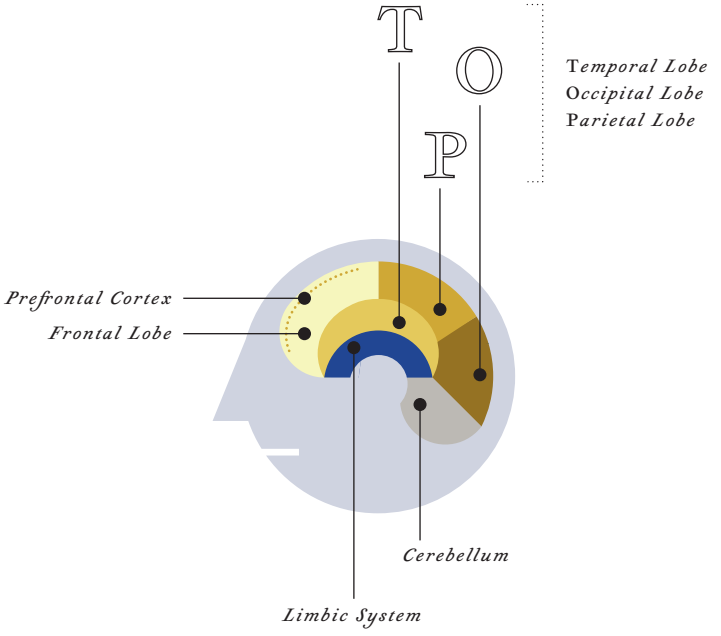
There are different regions in the prefrontal cortex that may be specialised with different functions. Prefrontal cortex is not only responsible for functioning **working memory or flexible problem-solving** (these two processes occur precisely in dorsolateral prefrontal cortex). It has many other functions as well.

Prefrontal cortex is responsible for focusing, higher-thinking skills like building a meaning or planning, decision-making, drive, and performance. Its role is to regulate social behaviour and mood by calming us down if necessary. Moreover, filtering and regulating one's expressions when experiencing elevated emotions, for example. (Runco 2007; Seppälä 2016) (ibid.)

HOW HIGH-INTENSITY EMOTIONS AND THE OVER-STIMULATION OF SENSES EFFECT ON THE HIGHER-THINKING SKILLS

> If the prefrontal cortex is not fully functioning—for example, it may be hard to access because of the highly activated animal brain, or there are lesions in particular regions of the prefrontal cortex—it can lead to **difficulties to generate ideas, make decisions quickly and efficiently, and it can cause a lack of drive, an absence of willpower, disinhibited behaviour, and blunted emotions. Dysfunctions in the prefrontal cortex can also lower the memory and attention capacity.** (Runco 2007; Seppälä 2016) (ibid.)

The frontal lobe does not hold long-term memories but it is the final processor of information. The prefrontal cortex that covers around half of the frontal lobe combines information which was already highly processed by the TOP areas and enables still higher cognitive functions e.g. ***working memory, intentional control of focus, and cognitive flexibility***. (DIETRICH 2004)



What's cooking?

Imagine yourself as a chef who is in charge of the kitchen. The kitchen is filled with different tools for cooking, and all kinds of ingredients you can possibly imagine: sweet and sour, salty and bitter. From these ingredients you are suppose to prepare the most savoury dish that tingles all tastebuds.

These ingredients hold every piece of information that has ever been put in store. The sharpest knife at your kitchen is your frontal lobe. The pots and pans are meant for different kind of cooking—fast and slow. The longer you let the ingredients brew in the kettle, the more carefully evaluated the creative insight becomes. However, when feelings boil over you can take an advantage of that as well—but only if, you know how to channel the intensive emotion and exchange it into an expression.

What comes to creative self-confidence and the quality of creative insight, it may be that some of the ingredients have gone bad, they have got mixed, they are rotten, or even poisonous. It may be that you can not even recognise the bad ones.

Then. From time to time other cooks visit your kitchen, interrupting your cooking or messing up the organisation of ingredients that you have carefully labeled as the "good ones". Both, too many cooks in the kitchen and the difficulty of recognising bad ingredients can ruin the whole process.

Because the success of metacognitive process in creative self-confidence depends heavily on an individual, and one must stay in charge of their thoughts, the doors of the kitchen should stay closed and locked until necessary preparations are done.

In addition, creativity is dependent on the situation. You do not cook in a similar way for every occasion, do you? Sometimes even the tiniest details are significant for a successful recipe, but what creates that recipe where all the tastes are in a perfect balance?

According to Dietrich creative insight is never just one of these four types in their pure form and instead, insight "arises naturally from a mix of these four basic components". (Dietrich 2004, p. 1015; p. 1018)

DELIBERATED INSIGHT THAT CONSISTS AFFECTIVE DATA

DELIBERATE MODE EMOTIONAL STRUCTURES

Insight depends heavily on specific emotion (e.g. complex social emotion) which requires involvement of the prefrontal cortex. It is likely that these insights conforms individual's *norms* and *values*, and that emotional content can be *consciously* manipulated when it is retrieved to working memory. It is doubtful that insights based on basic emotions can be deliberate because neuroanatomical connections between the amygdala and dorsolateral prefrontal cortex are limited, and therefore there are no direct pathways for the data. (DIETRICH 2004, P. 1019)

DELIBERATED INSIGHT THAT CONSISTS COGNITIVE DATA

DELIBERATE MODE COGNITIVE STRUCTURES

The quality of this type of insight is related to *knowledge* and *expertise*. The content arises from cognitive database, which is then deliberately processed. This rather *systematic* way of generating insights benefits from a large amount of varying knowledge. "The more knowledge is readily available (in long-term memory), the more relevant items can be 'juggled' in working memory.".

(DIETRICH 2004, P. 1019)

SPONTANEOUS INSIGHT THAT CONSISTS AFFECTIVE DATA

SPONTANEOUS MODE EMOTIONAL STRUCTURES

The quality is dependent on person's skills or appropriate expression. "Especially intense emotional experiences create a strong need for creative expression (Torrance, 1988). (…) Emotions signify biologically significant events, neural activation in emotional structures make for 'loud' signals that are designed to enter consciousness and impress the organism (i.e. make one's brain to response and the body to react). (…) While the emotional nature of the insight certifies to its importance, the unintentional nature of the insight adds to the conviction that such experiences must contain universal truth."

(DIETRICH 2004, P. 1019–1020)

SPONTANEOUS INSIGHT THAT CONSISTS COGNITIVE DATA

SPONTANEOUS MODE COGNITIVE STRUCTURES

Insight benefits from a large variety of knowledge, but the insight that arises from spontaneous processing may feel like it happens coincidentally: "(…) there is no apparent effort or intention associated with these intuitive insights". When facing a dead end, one may need to brake "the block of constraints" through e.g. relaxation or incubation. The quality of insight depends on individual *expertise* and the amount of cognitive data that is in store: "In the world of observation, chance only favours the prepared mind"

(DIETRICH, IN CITED PASTEUR, 2004, P. 1019)

What's cooking?

Release from the slavery of old data that is in store

Even though at first glance these four combinations, that generate different kind of creative insights may seem complete opposites compared to each other—and they do have four distinct neural circuits—the final data is always processed in same place: The frontal lobe.

Where and how does the conscious information travel all the way there?

Each part of the brain has its role in enabling a fully functioning human body. Functional neuroanatomy aims to explain hierarchies within the brain and each area by its function—also, from developmental or Darwinian perspectives. Runco (2007) argues that "(…) neuroanatomical circuits, systems and networks may be the most important for understanding creativity." (RUNCO 2007, P. 86).

Previous chapters explained roles of the limbic system, cerebellum, and frontal lobe in brief. However, when explaining creativity it is crucial to understand that actually ***most areas in the brain are involved in creative thinking*** (and generating insights), even though prefrontal cortex is evidently the central structure in creativity (DIETRICH 2004; SAWYER 2011).

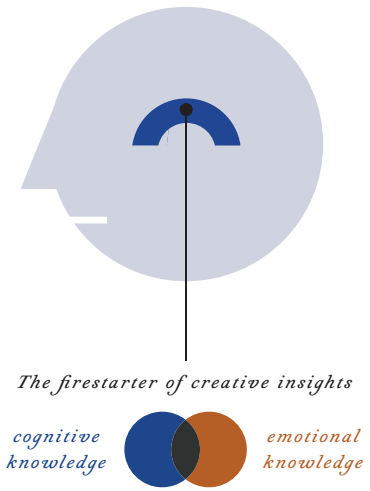
> "Frontal lobe provides for 'cognitive flexibility and freedom, and releases us from the slavery of direct environmental triggers or the memory stored in the TOP" (DIETRICH 2004, P. 1014)

It is generally agreed the TOP is the site of long-term memory storage and its neurones are devoted to perception.

There are two different storages in the brain for each, emotional and cognitive content. This content has not always been there. All items have been added on the shelves one by one—after the brain has extracted valuable data from the vast amount of all sorts of information coming from outside and the frontal lobe retrieves information from these storages (DIETRICH 2004). To be more precise ***cognitive and emotional content*** is stored on the TOP shelves (bad pun, sorry) for long-term, and they are physically quite near to each other.

In insightful human information processing, *the maturation process of emotional content* is ignited from the set of limbic system structure (e.g. amygdala) before it travels to more sophisticated frontal areas in the brain. That area produces complex emotions or evaluates complex social situations, for example. *The maturation of cognitive content* ignites as well from the limbic system, but mainly in hippocampal structure. The processing of the cognitive content occurs also in TOP cortices. These TOP areas are also responsible for selective attention. (DIETRICH 2004)

"Each track keeps a record of its activity so that emotional memory is part of the emotional circuitry, and perceptual and conceptual memory are part of the cognitive circuitry (LeDoux, 1996)". **These two databases (i.e. emotional and cognitive) that are yet largely connected are integrated fully on the dorsolateral prefrontal cortex** (DIETRICH 2004, P. 1012–1013).



Even though human perception is selective, the long-term memory storage is limitless. One can add an endless amount of items on this storage—however, some of the ingredients will expire, and some will begin to taste and smell different over time. The brain resets itself every once in a while, and "forgets" the old information when something new and more valuable data comes in. ***Cognitive neuroplasticity*** constantly rebuilds long-term databases and allows changes .

"Creativity is close to 80 percent learned and acquired. – Hal Gregersen, professor at INSEAD Business School" (Sawyer 2013, p. 5)

Dietrich adds, that creativity is the perfect example of cognitive flexibility: "[Creativity is] the ability to break conventional or obvious patterns of thinking, adopt new and/or higher order rules, and think conceptually and abstractly", of which many creativity theories emphasise, too (DIETRICH 2004, P. 1014). Dietrich hypothesised that the data, that is in store at (mainly) subconscious mind (e.g. memories), is finally processed in the short-term working memory, which is the final processor of creative insights.

One's own perception is guided by emotional and cognitive long-term databases and "on the border between cognition and emotion lies creativity".
(Runco 2007, in cited Averill 1999, p. 121)

WHAT YOU MAY HAVE GATHERED THUS FAR IS THAT

- ◊ Creativity is intrinsic, a fundamental activity of insightful human information processing (Boden 1998; Dietrich 2004).
- ◊ Creativity includes abilities like adaptation, learning, coping, and so on, but it is distinct from each of them (Runco 2007).
- ◊ In the light of cognitive neuroscience studies, however, staying constantly too busy decreases focus and higher-thinking skills that are both required in insightful information processing. (Dietrich 2004; Runco 2007; Seppälä 2016) (ibid.)
- ◊ Creativity is not only problem-solving or divergent thinking. Social judgment and appropriateness plays a role in every situation. (Raami 2016; Runco 2007; Seppälä 2016) (ibid.)

Please take a moment and consider this:

Think about all the places you have ever seen, all the people you have interacted with, all the things you have experienced and all the emotions you have felt during those experiences.

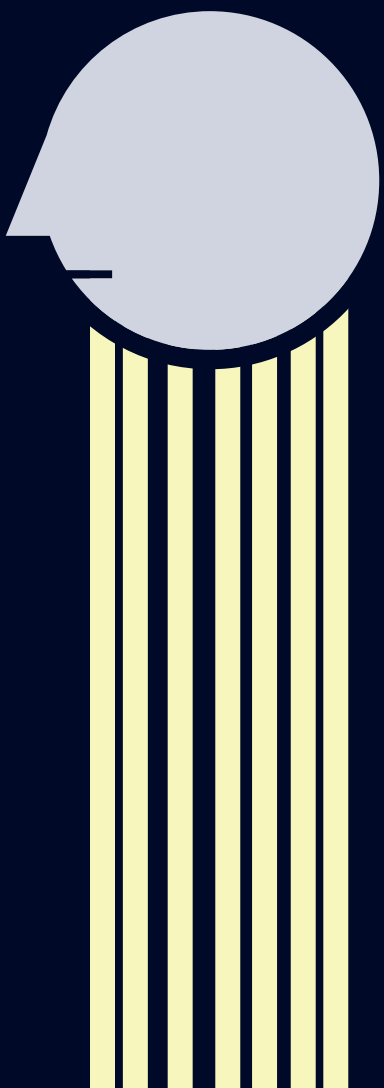
Turn all that information into bytes in your mind.

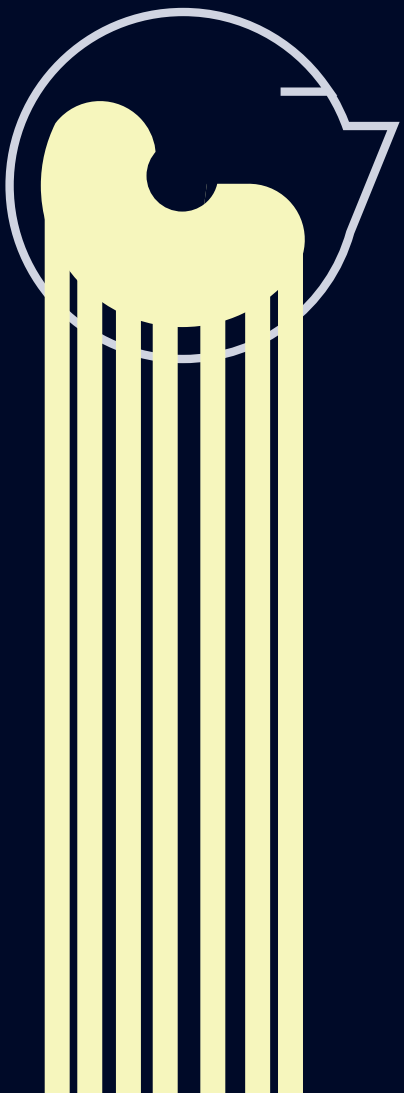
Think about the amount of data you hold.

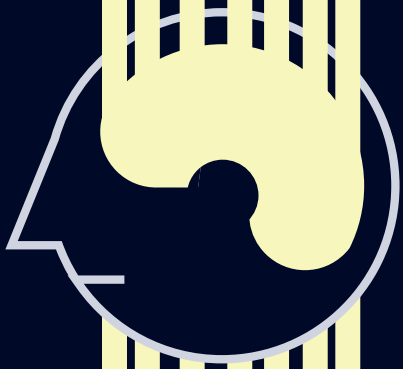
That is the amount of data you have ever absorbed and digested, even though you might not be aware of it at the given moment.

Yet, that data is readily available to be retrieved back to conscious working memory and for further processing—*for generating insights*.

"Given that perseveration to old information is anathema to creative thinking, it is evident that a fully operational prefrontal cortex enables cognition that is necessary for creative ability." (DIETRICH 2004, P. 1014)







The emotional brain is responsible for one's drive, headspace and intentions

Individual's motivation, attitudes, values, and interests are stored on the emotional shelves, and the main task of emotional content is to boost (or harm) creative behaviour. Even though emotional database may be full of "dirty", "me-relevant" information ("the case of E.V.R.") (DIETRICH 2004, IN CITED DAMASIO 1994 & CHURCHLAND, P. 1012), it is what drives creative work by adding personal value to the information that is under process. The affective knowledge can make or brake the creative process, and determine if information is or if it becomes meaningful for an individual. Runco adds that it is "(…) no wonder that neuroanatomists are looking to the emotional brain in their search for creativity." (RUNCO 2007, P. 90–91).

Widely speaking about emotions: Both, neuroanatomical and neurobiological studies have been able to pinpoint different areas and activities in the brain that play a role in processing the emotional content. **The brain works as unit and everything does not happen in the conscious frontal lobe alone. The frontal lobe has the last word in insightful information processing, but the majority of the processes occurs in the unconscious mind**.

It is possible to find a headspace that benefits creativity through mental and physiological adjustments. (Hanson 2013; Runco 2007; Seppälä 2016) (ibid.)

However, because at first glance "headspace" or "mood", for example, can be rather abstract concepts just like "creativity" is, I believe that it is more effective to first explain them from physiological perspective. When they are explained as what they are: The ordinary features of the human body and the brain, the ambiguity of these concepts diminishes. All of these are so familiar phenomena to us, that we do not pay too much attention on what kind of functions they are nor why we have these built-in features in the first place.

For example understanding the matter of the individual's headspace in insightful thinking is crucial, but without an individual paying attention to it then it can begin sabotaging the quality of the creative outcome. Without awareness on the signals that the body is sending (e.g. lack of focus, or elevated heart rate) one cannot influence on the built-in features of the human body—one may not even realise that some adjustments would be needed for making the work-in-progress feel more effortless.

These built-in features and signals (or warnings) exist for a reason, and one cannot just push the button to turn off these evolutionary instincts that were once essential for survival. That is what an individual cannot change in oneself, but yet they are the only tools for generating creative insights and expanding perception and knowledge, and the self-control over these features can be enhanced.

Creativity is insightful information processing at its core. From giving an understanding that *how* the brain processes the information, is essential in assisting an individual to become more aware about their own creative work-in-progress.

Taking the creative process under control requires learning how human body works while the brain is processing that data.

In creative process the quality of insight is dependent on *if* and *how* the emotional content is processed at conscious processor of the frontal lobe, in ***working memory***. The quality of an outcome depends on whether the emotional content is processed spontaneously which can arise e.g. sudden inspiration, or through slow and deliberate consideration.

Even though an individual cannot change much of the neurophysical features, one can consciously try to impact on the activity of the brain. One can have at least some control over the increases or decreases in the brain activity. There should not be any excuses why one would not take an advantage of the brain's ability to renew itself either. Conscious mental practices (e.g. deepening an experience) can establish novel connections, or transform the existing neural connections (e.g. overcoming the negativity bias). (HANSON 2013)

The creative process and personal motivation that supports the creative process throughout can be enhanced through consciously controlling, expanding, or reshaping the databases. Also, if the body sends signals that it is being overstimulated, for example, some physical exercises (e.g. mindfulness) can calm the animal brain down and turn the brain back to responsive state. (SEPPÄLÄ 2016)

Because the emotional content is stored even further deep in the brain than cognitive knowledge, and those areas do not have direct neural connections with the frontal lobe, it is rather important to follow bodily clues that the unconscious mind arises in order to keep the process and the quality in one's own control. Because there are no direct pathways for transferring emotional information to the areas that are responsible for higher-thinking and instead, the information travels through multiple

areas in the brain before reaching the frontal lobe and prefrontal cortex, it is the reason why each prior area adds a little bit of their own spice to the data along the way. (DIETRICH 2004)

When the contaminated, or rather *seasoned* emotional content reaches the frontal lobe it gets redefined and filtered once more. The frontal lobe evaluates the data one more time. At this point of the information processing insight becomes appropriate or useful, or it does not.

At this point an individual is consciously(ish) making ***decisions***: One's frontal lobe evaluates whether the maturing insight will become a solution that meets the rules that are often set by a society, or if that insight develops into a solution that does not conform demands or expectations. These decisions can be intentional or accidental—accidental in a sense that for instance insight may have been poorly self-evaluated from the beginning, or that its timing was simply off and the insight-generator (read: the creator) believed that it would e.g. meet the expectations.

WHAT HAPPENS IF SOME OF THE NEURAL PATHWAYS DO NOT EXIST, OR IF THEY ARE DAMAGED?

It is important to understand the brain works as a unit. Furthermore, if even just one of the connections is disconnected the pathways delivering data changes as well.

For example mania and hypergraphia (i.e. "a compulsive drive to write") are proposed that they reflect decreases of temporal lobe activity, or that they are caused by the lesions in orbitofrontal prefrontal cortex which is responsible for inhibition/disinhibition (Runco, in cited Flaherty, 2007).

The opposite kind of behaviour; the flatness of emotions and alexithemia, for example, are related to corpus callosum which joins two hemispheres together. The findings with the split-brain patients represented that after the surgery where corpus callosum was operated, some of the patients showed e.g. lack of emotions and difficulties to interpret obvious symbols (see also Neuromyths p. 143).

The patients lacked feelings, and/or had difficulties to express or describe their feelings to others—they have "no words for feelings" (i.e. Alexithemia; "a cognitive-affective disturbance") because the different areas of the brain were not communicating with each other anymore. (Runco 2007) (See also: The case of Phineas Gage, Dietrich 2004, p. 1013).

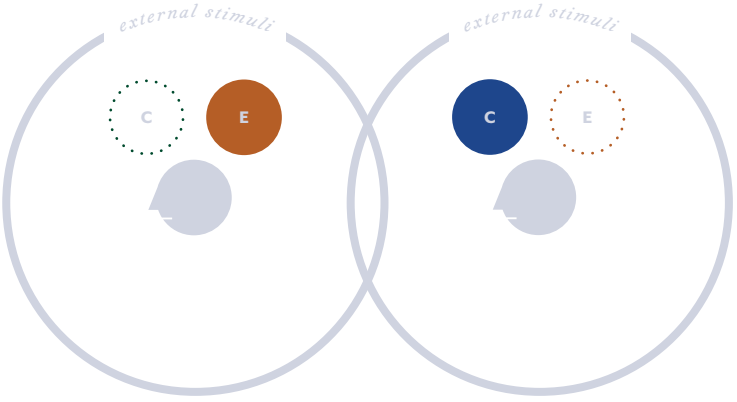
Because the brain works as an unit the cognitive content is always seasoned with emotional knowledge.

Society often sets the limits what is appropriate and what is not, and especially in the Western cultures the factual knowledge is often more valued than affective content. However, for generating creative insights they can be equally important. If you imagine two types of items on the TOP shelves; items that hold cognitive and emotional content, they must be also positioned very near to each other on the TOP shelves. The scents and flavours of emotional items tend to stick on the cognitive items and vice versa.

Emotional information in the brain plays a role on how we access and use the information when entering the cognitive database, too. Cognitive database may seem less biased but because the emotional content directs individual's interests; the targets of one's curiosity, it also steers *what kind of cognitive information* one has added in their database.

Emotional database often suggests an individual to seek information that meet their interests, and therefore the information that is stored in cognitive database is always biased at least in some extent. That is why cognitive knowledge often conforms individual's values and norms (that are stored in emotional database), but these "limitations" can be broke down by bringing awareness and giving special attention on what kind of things are in store. (HANSON 2013; OWENS 2011; SEPPÄLÄ 2016) (IBID.)

In addition, emotional content affects on *how* the cognitive content is processed. Cognitive content can become easily distorted for several reasons. For example elevated emotional reactions can affect the brain negatively and heightened stress levels can harm functions of the nervous system of which both decreases the ability to think straight, as mentioned before. The cognitive database becomes less accessible if emotional content is not in balance. Because of this unbalance it may affect on the whole creative process per se.



The modern studies can provide answers for the questions like e.g. where an inspiration comes from, why and how one acts on it, and how each decision is rationalised.

The neurobiological studies sheds light upon the role of long-term memory in insightful information processing. It may be rather easy to understand that the items that are in store on the TOP shelves, are the items that generate creative insights. However, because the field of neuroscience investigates what happens at each step of information processing and pays close attention to the moment of insight, the foci is not so much on the quality of stored data per se. Neurobiological studies focus on the present moment rather than on the personal history of an individual.

That data storage that is in use for generating creative insights is still a formation of individual experiences, the favourite tastes and ingredients, and it can be the most difficult thing to reshape as one likes because it has such a long history. Reshaping the databases is not impossible though, and it depends completely on an individual's intentions and goals. It is a deliberate decision of an individual that how exactly the databases should be reshaped, or do they even require any further actions.

MAPPING OUT AN INDIVIDUAL PREFERENCES

- ◊ Which processing mode is more familiar for you; spontaneous or deliberate? Or are they in balance during the production?
- ◊ For what kind of knowledge you prefer to trust; formal or affective? Does either one of them affect on the motivation, or on the completion of production?
- ◊ Do these *decisions* affect on the way of generating ideas or your creative expression and the outcome?
- ◊ Are you juggling with *all* the items in store, and drifting smoothly between both of the processing modes?

Like stated before, Dietrich has argued that creative insight is never just one of the four types in their pure form. Creative insight is a mix of these four components. (DIETRICH 2004) However, I consider that a certain mood or experiences that one is having during information processing or creative production affects on the quality of creative outcome. I also consider that we all may have preferences, or habits, how we are used to generate insights.

That may be a partly unconscious decision that is directed by one's own perception, but which affects a whole lot on the form and quality of insight. Depending on the situation, a little bit of purposeful emotional seasoning and following one's own personal interests, for example, can make processing the cognitive information more effortless. At first, becoming aware of one's own biases may help.

What would happen to the quality of insight if you purposefully get lost in your inner world and let the emotional brain to take control?

Besides cognitive knowledge has biased characteristics too, it is what stores our expertise and skills, and its quality is highly important for the quality of a creative solution—the "quality", which in this case refers to the socially conforming characteristics concerning one's insight. However for some cases, it is not completely bad idea to let an individual-dependent, stubborn, emotional, and even a bit animalistic content to take charge either, and to follow one's very own preferences, drive, or the inner world.

One generalised, quite negative idea concerning the "creative people" that I have heard a lot (even from my fellow creatives), is that:

> **"Creative people tend not to finish what they have started"** (FIONÁN 2018, WHO, BY HIS DEFINITION, IS A REALIST ENVIRONMENTALIST/NUCLEAR PROPONENT-*GUY*)

In his opinion "creative people" get easily distracted, and interested about other things around them before finalising the task at hand. This statement is half true. It may be that "creative people" are more emotionally driven than others, and they may be more obedient to their own emotional content than what the social setting may be really valuing. It may be that their own personal interests and motivation runs over the cognitive, more "rational" or more "high quality" database.

(This is just a speculation, but here I see a few connections to general behavioural tendencies that I explained in the previous chapters:) The built-in mechanisms in the brain that makes us humans to notice sudden changes in the environment may be more familiar to people, who are prone to be more responsive (i.e. sensitive) to their environments. When a person is constantly bombarded by external data, but is missing a filter for that excess information, it might make picking up the most familiar things more difficult (i.e. familiar data). It may be that "creative people" are more responsive. When there is too much external stimuli for that person, it does harm the ability to focus. When one is lacking attention, the brain-

approved data is often aligned with our inner emotional worlds and needs.

When the emotional brain is in charge, an ability to distinguish and filter relevant data from the white noise is more difficult, and the perception becomes very narrow and is directed within, or the opposite—perception is not directed to any focal points. For other people this might seem that one has lost focus or is lacking motivation. I have been wondering that could the tendency to be more responsive for external data be more like a feature in the brain—a data-filter feature that varies from person to person. That is what Aron (2017) theorised as well. However, not all "creative people" are like that.

Not all creative people are "sensitive" nor lack the focus.

Furthermore, what if the "creative people" let their personal interests (i.e. emotional content) to take a lead in the process because they *internally know* it is also beneficial for the outcome? That the unconscious mind tells that an outcome can benefit from emotionally seasoned cognitive content?

What would happen to the quality of solutions if everyone had an ability, courage, or even a chance, to intentionally mix emotional and cognitive contents in generating insights without any social limitations?

Would it really be such a bad thing to get more distracted with our inner worlds every now and then?

It must not be forgotten that one's own curiosity, motivation, or drive; the inner needs or tendencies arises from emotional database. So is affective content less important than formal knowledge? I consider that the preference to trust one's affective knowledge may make one to seek ***a variety of information***. Then there would more variation with the items in store, that one's mind can then juggle with when generating new combinations from that data. **The more the data there is stored in both of the databases, the more available alternatives and a wider set of knowledge for generating novel combinations**. Furthermore, when there is more available data in store, the end result would be evaluated from multiple aspects instead of a narrow set of options. In some cases this kind of variety of information can only ***improve the quality of creative solutions***—just as much as the knowledge from a particular domain can, for example (i.e. formal knowledge and expertise).

Especially when taking ill-defined challenges into consideration, the vastness of knowledge outside one's expertise or domain can be seen as a positive thing. For seeking particular solutions, it can be only beneficial

to let one to be curious about everything *and* everyone around them. The rich, varying content that is in store—that has originated from a personal need or drive to seek new information—can unlock new areas in the brain that allows an idea to mature into larger dimensions.

However, what inhibits this type of flexible juggling with all of the pieces of information, and constrains the smooth shifts in between spontaneous and deliberate processing modes? Why only "creative people" are suppose to practice this type of creativity?

Emotional content does not kill expertise, and cognitive content does not kill divergent thinking skills either.

> For these reasons, I would correct the previous statement a bit: "~~Creative~~ People tend not to finish what they have started if they are not aware of built-in evolutionary mechanisms in the brain, or the quality of items stored in long-term databases, because these items are going to be retrieved over and over again into the short-term processor that can give the ideal finale to original thought—creative insight."

The people who *do* get more easily distracted by external stimuli—moreover, whose personal tendencies to look out for new things when they should sit down and focus on the things they already know—are often burdening the capacity of their working memory. They may go too far in limiting where they look (OWENS 2011, P. 30).

In opposition, the ones who "fail to see what is right in front of them" (OWENS 2011, P. 30) may have only a narrow view on things. There is less variety in the knowledge stored in long-term memory. One may have used to conform the situation, and deliver the exact same solution that they are expected to—over and over again.

Whereas the "blindfolded" people often fail to see a chair in any other way than just a chair, the ones who have lost their blindfolds see a chair as an annoying element that is blocking the light coming from an open window and casting a shadow on the floor and the wall where sits a fly that flaps its wings… and they cannot completely comprehend or focus on the full image.

If just the other eye would be kept open (an eye batch would be a great option) there will be at least some balance for gradually progressing thinking processes and with the maturation of insight.

Depending on individual's goals and passion one can strengthen either databases intentionally, but if one wants to come up with more high-quality insights and feel more in control, I argue that affective–rational knowledge should be somewhat in balance. The neural plasticity would enable balancing one's own databases but only if one first becomes aware what are the missing pieces of information. Dietrich suggests something similar when he notes that creative insight is always a mix of the four basic components—mixing four different *tactics* is only beneficial for the quality of insight.

There is no need to blame "creative people" to be the only guilty ones for being easily distracted. If someone is not being able to finish the task they have started, the only scapegoat can be found in one's own head.

Human perception is limited, and so is the conscious, deliberate mind that is processing the final data.

That is yet another universal *glitch* in the brain that we all have; the limited capacity of working memory. However, also that limitation has its purpose.

WHAT IF THE BRAIN DOES NOT DO THE REGULAR INVENTORY AUTOMATICALLY? WHAT IF ALL THE ITEMS THAT ARE IN STORE ARE KEPT FOREVER, AND CAN BE RETRIEVED BACK TO CONSCIOUS MIND A BIT *TOO* EFFORTLESSLY?

> The "normal" brain automatically erases irrelevant connections, and the unneeded knowledge that has been gathered in the databases. However, if this cleaning system is not working an individual is suffering from hyperthymesia; a difficulty to push memories out of the head which interferes day-to-day life. Hyperthymesia is not well understood, but it has been hypothesised to be "a close cousin of acquired savant syndrome"—that there is a special pathway between the suppressed unconscious memories and the conscious mind which provides a "privileged access" to every single piece of information that the person has ever recorded in the brain through experiences and emotions. (Haseltine 2018)

What's on the table?

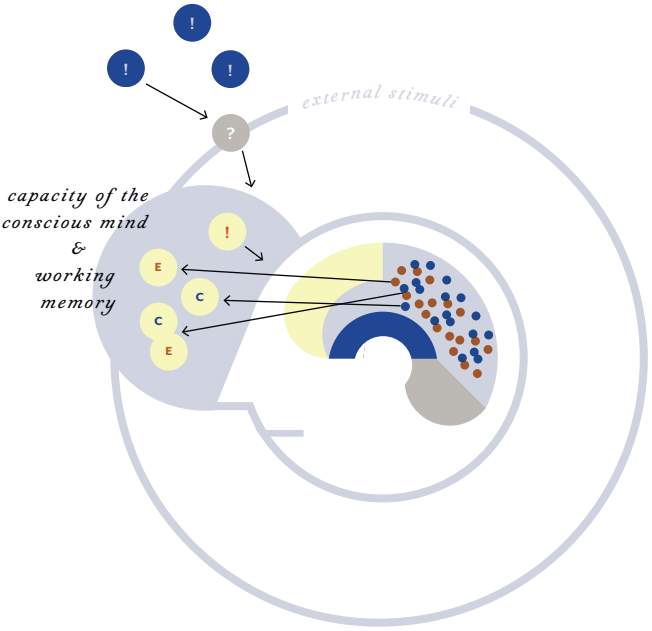
Working memory is the "buffer" that is responsible for finalising the maturation process of creative insights. An average person can hold approximately 5 to 9 items in working memory at the same time.

If working memory was explained from the perspective of insightful, creative thinking, then one should consider that there is always three different types of information that is simultaneously laid out on the table: External stimuli, emotional data (e.g. one's mood), and the cognitive knowledge (i.e. "conventional" information). All this information is either coming from outside or retrieved from the long-term memory. The conscious processor simultaneously handles the external stimuli, and internal stimuli; the items taken out from the TOP shelves. Working memory buffer organises that information, and puts it in place.

In order to create ***creativity-friendly environment*** where thoughts and half-baked ideas are allowed to mature into creative insights, these three variables should be in balance at least in some extent. If one of them is overflowing—or in other words, when there is too much of external information coming in (e.g. smartphone notifications that catches our attention constantly), if one's stress levels are heightened because the person is overwhelmed with grief or any other high-intensity emotion, or if one is solely relying on cognitive knowledge and neglecting what their emotional brain is trying to tell (e.g. self-motivation is lacking), then the quality of an insight will most likely suffer too.

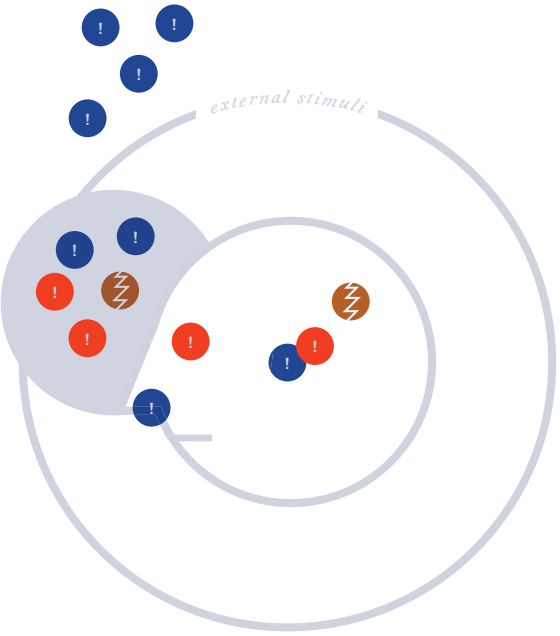
Because the short-term memory can only handle a limited amount of items, it is crucial to pay attention on *what kind* of items are available.

It is rather important to realise what happens to the quality of insight if one has only the unvarying sort of information laid out on the table.



There are only a limited amount of available slots in working memory. For example, a child who is learning numbers has numbers 1 to 5 and all the slots are already taken. In opposition, when cognition develops, the adult mind can fill the same slots with more complex information: Then one can fill each slot with series of numbers e.g. 543, 239, 839 and so forth, but yet the numbers will only fill one slot from the working memory.

I read some article a while ago that this might explain why it feels like time is running faster when you become older: We lose the ability to notice all the little nuances that could be perceived and savoured for longer and in detail.



For an intensive problem-solving process, for example, it is rather crucial to maintain at least some focus. All the things that you have on your plate, whether it is internal data (e.g. a broken heart) or external data (e.g. loud, sudden sounds), is going to affect on your ability to process information and maintain the focus—all of these are draining your working memory, because that data demands attention and it can fill all the slots that are available.

We can easily lose focus if external factors take over the available space of working memory, or if our intrinsic novelty seeking tendency is making us to take too many directions at times. That focus would be much needed for finishing the task at hand, but *we may start to feel unexplainably drained*.

Lost focus can lead into a situation where insight can not arise at all, or the quality of an insight has suffered because one's working memory got fulfilled with irrelevant data. Then, a person may feel blocked or incompetent but cannot maybe point out the exact reasons behind the block. Therefore, it is important to explain the internal factors that an individual is responsible for, and which can constrain or sabotage one's process. It may help one to spot their pitfalls in the process and crystallise whether it is up to them that is sabotaging the creative process, or if it is something else—things that one may not control or have an impact on, like the surroundings that is overstimulating the senses, for example.

Draining one's own working memory may be the biggest saboteur for insightful information processing, but consciously controlling the data that is burdening that capacity is possible.

Because the amount of information is limited that can be processed simultaneously in working memory, filling the working memory capacity *foolishly* may lead to different destructive scenarios. For example, we may ferment chaos to our systematic problem-solving ability by allowing too many external stimuli to enter (e.g. busy surroundings), it is a saboteur. That can make us blinded to the things right in front of us that are looking for our attention, tasks that would need to be finalised.

However, if one is consciously paying attention to the familiar surroundings and walking with all senses open, then we are gathering and recording more pieces of data into the long-term databases. When we rely too much on what we already know (i.e. follow our personal biases, routines, preferences, or "primary" databases) and rely on the process how we have used to handle that information, many crucial details can be left unnoticed.

You see, because human creativity can be seen forming from three components; perception, thinking and expression, there are pros and cons with what kind of data is on the table and when that data is useful for creativity. For that reason neither of these strategies are "wrong", if there is a balance, healthy self-criticism, and self-awareness. In the end, working memory is the foundation of aware thoughts, and it is the base where insightful processing initiates.

"When a person actively and mindfully considers anything, that information is in working memory" and [creative] insight occurs in conscious mind.
(Dietrich 2004; Runco 2007; Sawyer 2011) (ibid.)

"The front of the brain is associated with the highest, most deeply human abilities—what are sometimes called "controlling" and "executive" functions of the brain (Srinivasan, 2007). Representational systems, such as symbols and verbal meanings, are processed in the frontal lobes." (SAWYER 2011, P. 142). However the conscious mind is not all that we carry between our shoulders, and the rest of the brain is not under one's total control at all.

Just to give an idea of the amount and speed of data that is processed at each moment: An average brain weights only unimpressive 1,4 kilograms but it has a staggering amount of 80–150 billion specialised neurones that are constantly firing signals from 10 times up to 50–100 times per second.

These signals transmit information through the connections between neurones (i.e. synapses), and each neurone are connected with 1.000–10.000 other neurones. These connection form larger routes and tracks for the data, the neural circuits. (Hanson 2007; Sawyer 2006; Sawyer 2011, Raami 2016) (ibid.)

It should not come as a surprise why the majority of these processes occurs without us being aware of them. The incomprehensible amount of data that the brain is continuously processing would not be possible for a person to handle if it was processed consciously. That would completely ruin our ability to make any decisions. Raami (2015) gives an example:

"Dijksterhuis et al. (2005) mention that, depending on the task, the capacity of consciousness can be 40–50 bits per second maximum, while the human senses alone can handle 11 million bits per second, of which 10 million is through visual sensing.

Buying a house would require 6.6 billion bits to be processed, which means that it would take 4 years to make the decision with consciousness alone (Dijksterhuis, Aarts, & Smith, 2005). (Lipton, 2005; Zimmermann, 1989)." (RAAMI 2015, P. 42)

This filtering processor that we carry between our shoulders generates thousands* of thoughts every day. Obviously not all of these thoughts are creative insights nor even conscious, fleeting thoughts but people may want to admit that the capacity of the brain and its information processing system is quite impressive.

* I only want to give a vague number because of the on-going debate about this topic. The debate begun from an article the National Science Foundation published in 2005, and which regarded a research of an average person having about 70,000 thoughts per day. Currently, the estimates about the topic are that an average person would have about 12,000 to 60,000 thoughts per day. "Of those, 80% are negative and 95% are exactly the same repetitive thoughts as the day before and about 80% are negative.".

However, all great minds think alike.
We all share a similar brain structures that are able to generate creative insights.

Moreover, we are all born with creative potential. However, what determines whether that creative potential can thrive depends heavily on an individual maturation: What has been stored on the TOP shelves. It depends on what kind of cognitive and emotional material is readily available for the frontal lobe to retrieve.

The brain and the whole embodiment of ours is a living organism that constantly aims to adapt its surroundings. The brain is constantly learning from what it is fed.

We record carefully selected data into our databases through personal emotions and experiences, that are both just mental and physiological reactions rooting to a situation or an environment. Most of the time affective data that is recorded in the emotional brain, is what drives people, but the data and the brain also evolves as we age and develop. That, for example, explains how an intellectual capacity matures and how the databases grow emotionally and cognitively through ageing.

We also constantly filter external information back and forth together with our surroundings. We communicate. We interact with our environment. The data that sticks into our unconscious minds from the surroundings—the data that can be retrieved back to the consciousness—forms who we are today. It is also a reflection of our unique, personal histories. We are indeed the results of our environment in many levels.

Please take another
moment.

Do you still remember the *amount* of data
that you have gathered during your lifespan:

All the data that has been selected,
absorbed and digested from your
surroundings, through senses, and
through experiences and emotions
of your own?

The unique items of data, that are placed
on the TOP shelves, and that you are not
constantly even aware of?

The items that are laid on the table
every now and then, in so that the
conscious working memory processor can
investigate them and evaluate if there is
enough potential to grow into insight?

Hold on to that thought for a minute.

Like the previous chapters explained, everyone already has the building blocks to generate insights. What they also explained is that the brain is beautifully flawed and human perception is limited, and in matter of minutes external stimuli can ruin the process of generating those insights.

Understanding the flawed and yet magnificent brain and its ability to generate creative insights from normative data, is also about becoming aware of the shortcomings as a human being.

That awareness reveals provides a possibility for self-control in the creative process. That awareness provides a possibility to improve the evaluation of one's own insights which may improve the quality as well.

At the moment of despair when one faces a block during ideation or executing a task, or in the moment when someone else is making one doubt their creative potential, it can be overcame by trying to bring the unconscious reactions into the conscious mind, and by asking "why do I react this way?", "why I did not see that coming?", or "why does this feels difficult, I have done it for many times before?".

Also, if someone is puzzled with why their head might feel hazy it is important to understand the relationship of stress and higher thinking abilities. For example when the phone alerts and new notification comes in for the eighty-fourth time in one day—for the eighty-fourth time in one day the brain goes ***"oh, what's that!"***—and one may become irritated, it should make them stop and wonder if they are any different than Pavlov's dogs?

Cognition and creativity goes hand in hand.

The shortcomings and limitations of a human being can become possibilities only if they are first acknowledged. For example negativity bias, expanding perception, and growing one's knowledge are rather easy to develop by making *conscious decisions*. Those things can be tamed and taken under one's own control.

However, what comes to the built-in ability to generate insights is that, depending on the quality of items that are stored long-term and depending on how they are processed; spontaneously or deliberately—these things matter on the quality of insight. Even though an individual may have tools to improve one's own databases and two processing modes, that is not all what successful solution is dependent on.

CREATIVE SELF-CONFIDENCE CONNECTED TO NORMATIVE DATA AND INSIGHTFUL INFORMATION PROCESSING

> **Explaining creativity solely as an independent process of an individual does not explain the differences why someone is ought to be creative and someone is not. It does not explain why some people act creatively and some do not. It does not explain that even if the person considers themselves creative and recognises their potential, then why that person may yet inhibit their creative expression and for instance, never present their ideas out loud?**
>
> Surely the previously presented information (i.e. neurobiological approach) may become useful for people, who have already recognised their creative potential and **who are already taking *an action***. The people whose creative self-confidence is on that level that they are encouraged enough to produce creative manifestions, and the ones who may only struggle with the actual process or execution.

There is a reason why I describe creative self-confidence as a driving force that is more than just "courage to create". That is that there must be also ***a need to create*** before a person takes action and pushes their potential to higher dimensions.

I believe that if creativity wants to be truly explained, there is not only a need to provide knowledge about the modern concept; how creativity is defined or studied, but also there is a need to make people to question whatever they have learned about creativity before. There must be a voice, more tangible surface that one can relate to: That voice should speak directly to they themselves, and their uniquely built databases.

> In order to improve creative self-confidence it is important to give an extra attention to what may have made one to doubt their creative potential in the first place: How selective and limited perception and stereotyping have created our personal biases which may have also affected on one's own idea about their creative self.

One approach to figure out that what one's databases are all about, could be asking all the puzzling questions about one's creativity. This approach would have to vary from person to person, and in that sense more than one perspective should be provided in order to make the metacognitive process in creative self-confidence succeed.

Therefore, I try to briefly catch the essence of all possible answers that lies under lowered creative self-confidence: What could have been things that distorted one's databases and how one can overcome these distortions and redirect, or rewire the knowledge in the brain. However, the rest of the process—the rest of it lies completely on the person's free will.

> The goal to improve one's creative self-confidence is not to ask particular questions about their creative potential, or tell how to improve creative process. This research is not about creating a self-help book that aims to steer the person to particular direction.
>
> The goal and the whole idea about metacognitive process in creative self-confidence is to attempt to arise personal insights and to assist one to recognise and choose what suits them the best.

The exact same things that can improve individual's creative performance can also boost creative self-confidence: The unconscious information is brought to the awareness which, only then, can be processed and re-evaluated again. The aim is to make one actively and mindfully considering *creativity* as insightful information processing that is dependent on person's emotional and cognitive knowledge stored in the brain. It is good to remind that the storage space is ever-changing and one can direct how it will be rebuilt or what kind of items there are available to be retrieved in the working memory.

It should be understood that all the stored items are at least somewhat seasoned, and they do not represent the only "truth".

In order to internalise this idea, one can find an objective perspective from looking at themselves as an organism that is influenced not only by its features that shield the brain but also how these same features steer one's perception and forms individual's biases and opinions—about the creative self, too.

> Particular human limitations like one's perception, persistent biases, and the capacity of the working memory are rather hard to expand over night but I believe that becoming aware of them may help one to overcome, or even take advantage of their own biases about creativity per se.

I previously argued that "No(t even the most creative) individual is always confident in what they do"—that is because thus far I have not

met one, bar none. That was one of my first questions that I had when I begun developing the recipe for creativity—why I have not met anyone who would be confident about their creative abilities?

What I realised is that because we are *all* driven by particular features in the brain that are especially difficult to tame—especially by the unconscious processes which are taking over the majority of all the brain capacity, we tend to process data in a similar way. That got me to pay more attention on the data about creativity per se.

If creative potential lies in all of us and creativity can manifest in various ways, then what determines that someone takes an action and feels comfortable showcasing their creative potential in the end? Why some people are so suspicious about their potential, and what makes even the trained creatives—the creative elite to have doubts about their own potential? That is, the lack of awareness and personally processed data that has been stored in one's mind. Creativity is intrinsic, but the phenomenon of creativity is not equally shared privilege.

Please take a moment and think about—*creativity*.

Think about a creative person.
Think about the creative people.
A creative product.
A process or the creative production.

Think about *all* the situations where you have encountered creativity.

Think about *all* your own experiences with creativity, and *all* the emotions that it has made you feel.

Turn all that into bytes in your mind.

Think about the amount of data you hold.

What makes you think that the data about creativity would differ from any other data that you gather each day?

How would that data be any less or any more righteous than some other piece of information that the brain has selected? What makes you think that the information that you hold about creativity would be any less biased than your perception on other things?

Let's play it again, Sam: "Given that perseveration to old information is anathema to creative thinking, it is evident that a fully operational prefrontal cortex enables cognition that is necessary for creative ability." (DIETRICH 2004, P. 1014)

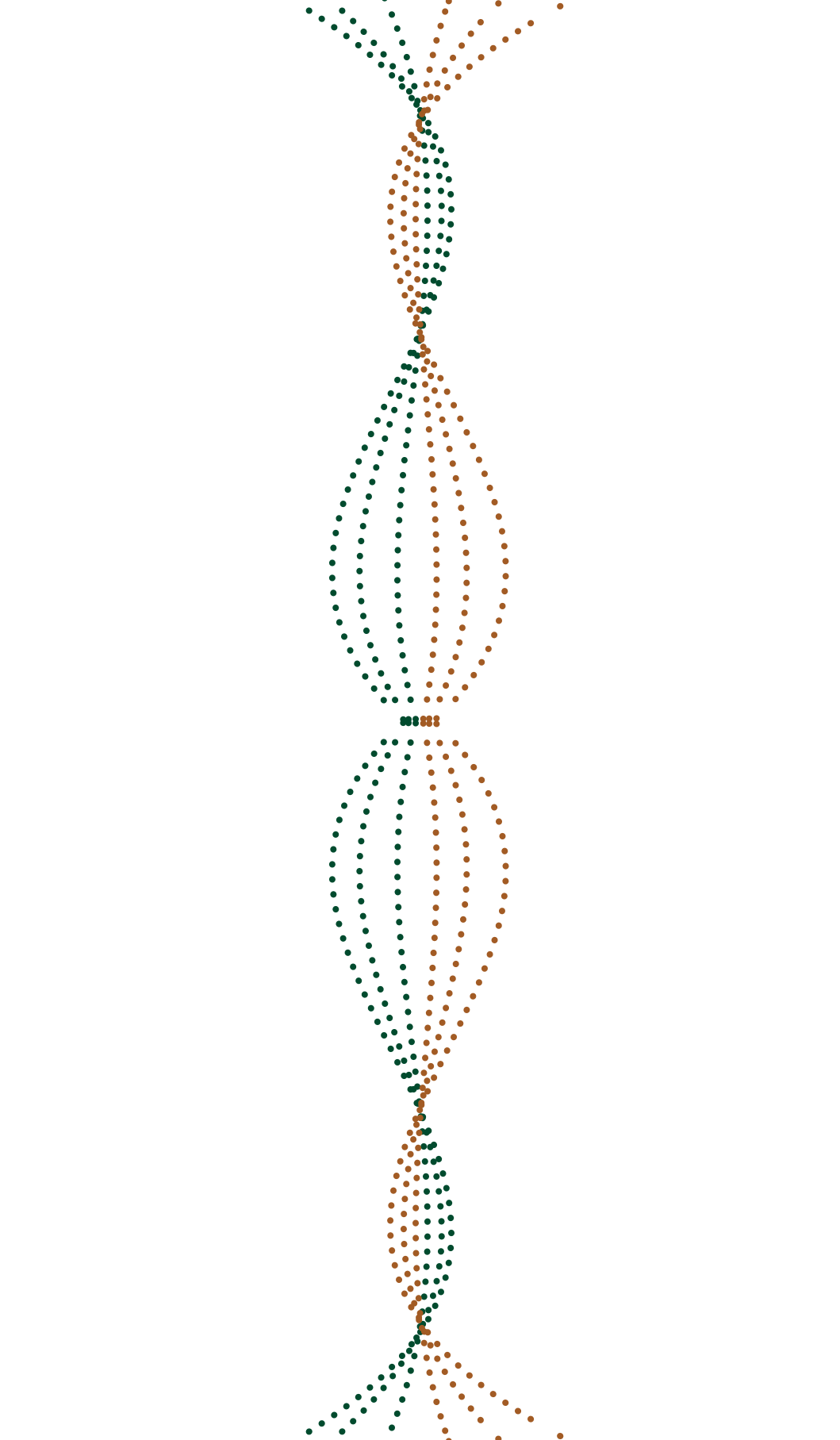
ENHANCING CREATIVE POTENTIAL BEGINS FROM UNDERSTANDING THE LIMITATIONS AND POSSIBILITIES OF AN INDIVIDUAL MIND, AND FROM SELF-REFLECTION

> For creativity and creative self-confidence it is crucial to get familiar with the resources one has for cooking—not only the good or bad ingredients but also with the techniques how one is able to handle these items in store. That can assist one to recognise their own biases. Improving insightful thinking process begins from that, and acknowledging the bodily cues. Those things can improve the production, and the quality of creative outcomes.
>
> However, improving creative self-confidence begins from acknowledging negative self-talk, and where it is possibly coming from. **Negative self-talk can be considered an effective indicator to make one to recognise what particular things make themselves doubt about their potential in the first place.**
>
> It is yet again just gathering and processing data. At first, when one is able to recognise one's own rotten ingredients, and poisonous ideas about creativity that can distort the personal ideas on creativity, then after that one can start to make adjustments and evaluate if they can have an impact on these issues or not.

Simply put: Pay attention on things that you have swallowed, and pay closer attention on the things that you are about to put in your mouth. If it *feels* wrong, it most likely *is* wrong.

EXPRESSION

Creativity is a unique manifestation of an individual—or, *a conscious social act?*



What builds the idea of creative self: Acknowledgements of one's own creative identity, potential, and expression

Creativity is not *only* coded into our DNA or "in our genes" like Sir Francis Galton suspected in the 1860's (RUNCO 2007). "Our [creative] potential depends a great deal on our genotype, our genetic inheritance. Our phenotype, or manifest talents, are the result of both nature (biology and genes) and nurture (experience). Thus biological factors contribute specifically to creative potential, and experience determines where within the range set by biological potentials the individual performs." (RUNCO 2007, P. 40; SAWYER 2006) (IBID.). The extent of an individual creative capacity does vary from person to person but we all possess at least some, never none, creative ability.

Please note, that the word "creativity" did not yet exist in 19th century, and did not mean the same as we understand it today.

As we grow up we tend to distance ourselves from our inner worlds and needs, and focus more on the outside—the external world with its expectations and demands. As an adult, one may only pay attention to the internal world; what is happening in your mind and body, when you feel extreme pain, grief or fear, or experience something really pleasurable like a taste or a profound feeling of love. For the creative process this is not ideal and internal awareness can help to notice these nuances arising from the internal world. (SEPPÄLÄ 2016; SAWYER 2006) (IBID.)

MYTH: CHILDREN ARE MORE CREATIVE THAN ADULTS (SAWYER 2006, P. 19)

WE BECOME MORE DELIBERATE AND SOCIALLY AWARE AS WE AGE: MATURATION OF THE PREFRONTAL CORTEX

> In addition to things mentioned in previous chapters (p. 60), the prefrontal cortex is specialised in making the social decisions as well. For instance, these social decisions can determine individual's conventionality or the desire to "be cool" (Runco 2007).
>
> Human prefrontal cortex is developing until we hit early 20s. It is the last structure to fully mature in the brain which confirms why the creativity of children may manifest in more **original** and **less appropriate** ways (Dietrich 2004).

In terms of neuroanatomy kids are naturally inclined not to adapt to their sociocultural environment which allows them to play with their internal worlds carelessly and spontaneously.

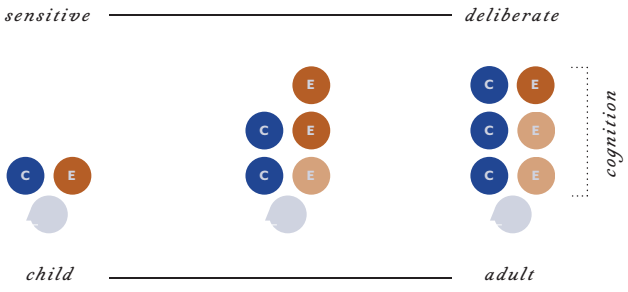
Creativity in children displays especially well how emotional knowledge is involved with insightful information processing. They may not have a lot of cognitive items stored on the TOP shelves yet, which affects on the quality of their decisions. Their insights have rarely any value for others but still they are capable of generating insights.

Affective knowledge is a reflection of one's surroundings and circumstances that person has faced earlier.

Aron (2017) points out that the previous experiences can either enforce or make particular personality trait (i.e. in her book; sensitivity) less visible. The person is always a product of one's environment in some extent. (ARON 2017) Creativity can be looked at in the light of human maturation, and also, as some researchers suggest, the social environment (e.g. parents, home, teachers, and peers) that provides experiences and options may influence on creative potentials too. "There are common slumps and stages, and creativity takes various forms at different point in life." (RUNCO 2007, P. 67).

There are several touch points during person's lifespan where social variables and creativity meets, and creative self-confidence matures together with individual's surroundings.

The neural system that enables human cognition also assures that we are vulnerable to absorb information from the surroundings before we are even born. Individual's creative potential and creative self-confidence develops from an interaction of internal and external factors; the social settings change, and ***social and cultural expectations coming from outside develop together with individual's chronological or maturational age***.



1st TOUCHPOINTS WITH CREATIVITY: PRECONVENTIONAL CHILDHOOD

As a small kid, no one expects you to come up with ideas that would be polished or useful for rest of the people. **You are assumed to be original who can generate a variety of *imaginative* insights**.

Parental creativity predicts children's creativity (RUNCO AND ALBERT, 1986). Children tend to imitate the thinking modes of their parents, and the parents who value *original thinking* presumably respect and appreciate originality and creativity that occurs through spontaneous [information processing] mode, value the same features in their children. "Children may internalise these values, as well as learn the actual strategies for original thinking. Valuation is very important for divergent thinking and creativity." (RUNCO 2007, P. 61). We have a need to socially fit in, already at the early stages in life.

There are some correlations with the similarities of personality between a child and the parent, for example: Apparently parents who are independent themselves may give more autonomic freedom to the child too. Independency feeds original thinking and if original thinking has a permit from an adult (i.e. the behaviour is accepted by the "authority"), the setting allows unconventional ideas and independent actions to take place. (RUNCO 2007)

> "In certain cultures and circles, if an adult is being playful, this can be frowned upon even though child-like tendencies and playfulness in problem-solving can be beneficial when trying to solve problematic issues. More often, when playfulness is part of the process, it may lead to Big C solutions (Gardner 1993)." (RUNCO 2007, P. 295)

EGO-STRENGTH: "I'M THE GREATEST"

Runco (2007) suggested that the most important thing parents and teachers can do to protect the creativity of their children and students is to reinforce ego-strength.

Ego-strength will allow even sensitive children to deal with pressures to conform. "If the term ego-strength is too psychodynamic for you, think of it as a kind of courage. As May (1975) said, we each need the 'courage to create'." (Runco 2007, p. 299). When talking about ego strength or confidence Runco is mainly referring to obvious creative domains; performance-oriented domains, for example.

I claim that the same confidence is needed in any vocation, in any act that produces a creative outcome despite of the value of that outcome. Runco continues: "Without confidence the individual may not even try to maximise his or her skills. The individual may need to believe 'I am the greatest' before he or she put the effort into demonstrating it." (Runco 2007, p. 299).

Runco adds that athletic domains probably require an extraordinary levels of confidence in order to gain dominance in the field: "Perhaps this ['I am the greatest'] is what it takes, in some areas, to be world champion. In more cooperative domains it is unlikely that an overly confident individual will get far. Social attributes are so important and reputations are essentially social constructions." (Kasof 1005; McLaughlin 2000) (Runco 2007, p. 300).

Feist (1998) found that self-confidence was one of the key characteristics in expressing creativity. The domain differences were apparent if artists were compared to nonartists, or scientists to nonscientists (Runco 2007).

2nd TOUCHPOINTS WITH CREATIVITY: A CHILD ENTERING TO THE WORLD OF CONVENTIONS

We step into another social setting when we enter educational institutes. Developmental theories recognises particular periods on development, and at one of the stages **our peers become *at least* as important as family**. At this stage in life—just before entering adulthood—a child, preadolescent, or adolescent begins to conform the social rules set by one's peers. Peers usually belong to the same age group, but the rule setters can be also the teachers or other adults. Fitting in becomes more important than it was in early age. (RUNCO 2007)

At this point in life **original thinking and creativity can be evaluated in opposing terms by both, an individual and the person's social setting**. It seems that even though we would try to adapt with social expectations in the world of conventions the best we can, sometimes *creativity,* on the other hand, allows behaviour that is different from the mainstream. At this age and in some social settings originality is socially acceptable behaviour—however, it depends on the social status.

USING THE WORD "CREATIVITY"

Please note that "creative potential" in this study equals only originality or original thinking and does not consider the other aspects of creativity.

BEING DIFFERENT AND ORIGINAL IS ALRIGHT IF YOU WERE THE "COOL KID": CREATIVITY DEFINES SOCIAL STATUS ALREADY IN EARLY LIFE, OR THE OTHER WAY AROUND?

According to an empirical, sociometric research of the relationship between peer status and creative potential (Lau and Li 1996), the most popular children—the ones, who were most liked by their peers—appeared to have the highest creativity ratings as well.

In the study, children were identified by five categories and nominations in creativity went to; popular children having the highest creativity ratings, the second highest creativity rate was nominated to controversial students who were liked by some peers but disliked by others, and the lowest ratings in creativity were held by average, neglected or rejected students.

Students were nominated by their peers and by their teachers' judgments, and the larger role of peer status became evident after finding that: "differences in creativity [ratings] were much more apparent in peer evaluations than in ones given by the teachers." (Runco 2007, p. 62–63).

Runco, McCarthy and Svensen (1994) found similar conclusions during a research with college students and art assignments, and the teachers who were professional artists: students were being more sensitive to differences than adults.

(Runco 2007, p. 63)

Even though children's nominations may not be as accurate and valid as their teachers', the finding raised a possibility that children may be more sensitive to the creativity of their peers than are teachers. Lau and Li's research was especially interesting because it did not only point out the importance of valuation given by the peers, but it also **concluded that creativity defined the social status**.

The results suggested that **"a popular child who holds some sort of leadership position, perhaps informally, might produce new and original ideas and thereby earn respect"**, although "Lau and Li seemed to think that social status among peers may or may not be influenced by creativity" because of some opposite results; less popular children's original ideas did not gain the same respect as if they were produced by a leader or a popular child (Runco 2007, p. 63).

I bet the "cool kids" are alright with their creative self-confidence today (I would love to interview them, though), but how about the rest? The ones who fell in between and had the lowest scores about their creative potential? Does the ones, whose peer status was nominated as average, neglected, and rejected still carry the same social stamp today?

Creativity sometimes gives an excuse or a permission to act different—however, that is how it is in adults' minds, and they may encourage for that behaviour.

Can social status inhibit creative expression, and can the sociocultural environment determine who is allowed to express it and in what way?

Is it possible that yet today their ideas are not considered original (because of their social status), and that still they cannot get their voices heard? And how exactly they were different compared to their popular or controversial peers; was there something about their appearance, personality, or something else?

It is quite logical why being likeable or a "popular" person allows creative, original behaviour, but why does the social surrounding suggest that being controversial equals creativity? If the *average*, *neglected*, and *rejected* still carry the same social stamp today then they are the ones for whom this study is directed at.

This may have something to do with the characteristics that indicated creativity in creative heroes from the past—or, how we know them from the history books. **We tend to pass the same knowledge for next generations** and in fact, it seems to be that there are some connections with the present knowledge about creativity today and the old conceptions on creativity. For example, **being original became a requirement for creativity in the late Renaissance**.

Also later on, the ideologies that were adapted by the 18th century society emphasised, that fighting against the social norms, or being controversial was "cool" and indicated creativity. These particular personality traits—or moreover; the social behaviour that was socially admirable or "creative" in the past, are still quite the same socioculturally admired traits that are associated in creativity today.

When explaining creativity—for the sake of collective creative potential—it is good to point out why one personality trait is no better than the other. For harnessing collective creative capacity we would need all kind of people, but the sociocultural setting is still determining who may enjoy the limelight, and what kind of personas are valued yet today.

Runco (2007) states that if a parent or teacher has implicit views or expectations about children's creativity, it will determine what kind of opportunities they will provide for the child. **For example, if an adult thinks that all children are artistic they may not expect much creativity from a child who can not draw**. Runco calls this mistake art bias. (RUNCO 2007)

Art bias means associating artistic characteristics or a talent to creativity.

Art bias may not be as obvious social convention as is greeting when meeting a new person for example, but it is an established norm anyways. **Societal conventions follow us since we are born but a young child is not necessarily aware of those conventions** (i.e. pre-conventional stage in development). This means that a child is not yet uninhibited by social conventions and they are not expected to be inhibited by them either. (RUNCO 2007)

When a child joins to pedagogical institutes; from daycare and preschool to high school and so forth, they also enter the world of conventions. **The child becomes more and more aware what is expected from them and in order to fit in, one may begin to pay more attention on "what my friends are doing"**. Especially just before entering adulthood, adolescents are giving a great weight to conventional and therefore typical normative behaviour (i.e. hyperconventionality). (RUNCO 2007)

Remember that you were a kid once.

Can you name which conventions you still hold that originates from your childhood? How about the conventions about creativity that you may have once learned and internalised?

Do you remember from who you learned those conventions? Remember that they were kids once, too.

"Conventionality is a kind of conformity, and creativity creative thinking requires noncomformity. (…) The conventional child is a conformist in a sense that he or she follows social expectation and imitates typical behaviours of his or her peers. This inhibits self-expression and creativity originality." (RUNCO 2007, P. 42)

This may explain why controversial students came second with their creativity ratings in Lau and Li's research. Maybe they were not conforming the social conventions as strictly as their peers.

However, creativity does not require rebellion nor unconventionality. It requires the courage to stay original and remain true to oneself, especially when the social expectations grows higher as *we* grow up and enter the adults' world. That courage can feed creativity that requires originality in person's thinking or with the expression of those thoughts—even at the stake of one's social reputation.

SOCIAL EXPECTATIONS TOWARDS ONE'S BEHAVIOUR MAY INHIBIT CREATIVE EXPRESSION

In the short story "Panties are just pillowcases for butts" (2015) that I wrote as my preliminary assignment when applying to Aalto University, I was writing about how our surrounding's expectations change as we age. The story was mainly about one of the human core needs; the need to be socially accepted and behaving in a manner that it is socially acceptable. It was about that kind of behaviour, that may inhibit how we express ourselves.

The short story was based on my nephew's joke about webfooted sheep—he was 3 years old at the time (at the pre-conventional stage in development). Ever since he had learned how to talk, he has loved to make jokes. He just turned seven this spring.

Although he still has an awesome sense of humour; witty and sarcastic seasoned with super bad puns, I have noticed some changes with his expression after he has entered preschool after finishing his artistically-oriented daycare. He still likes to paint and when he does he knows exactly how he wants to express himself—but the webfooted sheep have been replaced with Lego Ninjagos and other "cool" things his friends are also engaged with.

Fortunately some things will (hopefully) never change about my nephew: When he playing Hangman with his mother and it was his turn to come up with a word, he chose "perse". In Finnish language that is not-so-appropriate word for "a behind" .

"Children are often creative unconventional in their language, but then show an appreciation for conventions in the middle elementary school ages and grades." (RUNCO 2007, P. 42). Runco (2007) adds that after pre-conventional stage in development **a child can even become entirely literal**. The majority of pedagogical institutes, excluding e.g. Steiner education, introduces young children a new social setting that is based on linear and rigorous thinking.

In educational environment there are boundaries and rules that children are asked to follow. For that kind of creative thinking that would require originality, or more time and space for reflection—or, in other words; the freedom to play with thoughts—this social setting imposes us to unlearn from it. This social setting reduces our intrinsic, or natural creative thinking skills. For example, for inventiveness divergent thinking would be just as essential as linear or convergent thinking. **In order to generate an *ideal creative solution*, creativity would require room for critical thinking and time for evaluating that solution from different perspectives**. (SEPPÄLÄ 2016)

3rd TOUCHPOINT WITH CREATIVITY: ADULTHOOD

In the adulthood we begin conscious choice to conform or not to conform based on our *intentions* and *goals*.

These choices involve social judgment and fully functioning prefrontal cortex, even though they would be steered by our innermost wishes and desires.

In his book (2007) Runco presents the stages of development by their relation to creative behaviour. These stages characterises the majority of the population. He also examines how the ideas of creativity change and occur during lifespan. Runco points out the significance of upbringing and that there are some fairly universal trends.

The historiometric studies that Dietrich (2004) is referring to, are showing similarities in patterns and that *when* creative achievement will most likely peak during one's lifespan. **It may be that the most crucial factor for an individual's creative success** is the ability to evaluate one's own ideas, insights, and solutions from different perspectives in so that it will have at least some sort of impact on fellow humans—that ability **develops together with maturation of the prefrontal cortex**. **It is evident how fruitful, insightful creative capacity is connected with the maturation processes of the brain.** (DIETRICH 2004)

These lifespan peaks depend on one's discipline and not so much on chronological age, and "it has been proposed that creativity is stochastic in nature and that creativity in the arts and sciences 'differ in the extent to which that stochastic process is constrained' (Simonton, 2003). In either discipline, the start of creativity coincides with the maturation of the prefrontal cortex." (DIETRICH 2004, P. 1021).

According to Runco (2007) the stages of development are not entirely connected to chronological age neither. These stages alone will not necessarily predict one's creativity. Instead they "imply general tendencies (…)", but because we develop at different rates, and they are not entirely consistent with our conformity or non-conformity and conventionality and non-conventionality (RUNCO 2007). Individuals probably are pre-conventional once in a while, conventional once in a while, and post-conventional once in a while.

Creative potential covers the whole lifespan. However, creative *expression shifts several times* as the individual moves through different social settings in childhood, adolescence, and adulthood. The shifts involve maturational processes: Changes in genetic potentials, in motivation, or changes in the environment that alter the support for creative efforts. (RUNCO 2007)

In certain context, we all conform.

Trait X State interaction is an idea that behaviour is a result of both traits (e.g. conventionality) and immediate states (e.g. a classroom, a social setting, the home, or workplace). (RUNCO 2007, P. 43)

Creativity is a social interaction: Practicing authentic creativity

In order to build self-trust in creative expression, an individual may benefit from investigating one's own current values and ideas about creativity. If the current values and ideas are reflected to one's own past and present experiences or emotions, it may reveal if their thinking about creativity has been influenced by the peers—or by any other external factor.

The question is that what or who determines one's own creative behaviour and expression? Is there anything in their own history that may have influenced whether they prefer (or have the courage) to present themselves either rational, socially conforming thinkers, or nonconforming, spontaneous, and original thinkers, for example?

More importantly, neither of these tendencies are "wrong", because successful or impactful creative insights benefit from individual's emotional and cognitive knowledge, and also the deliberate and spontaneous modes of thinking.

Unconventionality is not a synonym for creativity, but original thinking per se may require some unconventionality and autonomy—even contrarianism. Even though contrarianism can be called "pseudocreative behaviour" because it often leads to intentional, unusual behaviour—meaning that *if* that behaviour is compared to the behaviour of the mainstream—it must be also reminded that the non-conforming behaviour of children is not entirely intentional. (RUNCO 2007) With them, "rebellion" is can be caused partly by the brain structures that are not fully matured yet.

With us adults the fully developed prefrontal cortex guarantees that our decisions and choices are aligned with the mainstream's—if we want so. Whereas our past experiences are still affecting on the background (e.g. was original thinking socially acceptable in our past social settings), when we enter adulthood the role of the sociocultural environment simultaneously grows even larger compared to our childhood. Our social circle grows larger as we grow up, and it is not anymore only about whether our parents accept particular creative expression—our behaviour is evaluated by or personal social circles and by our co-workers.

It is rather conscious choice that us adults can make, when we decide are we going to fulfil the social expectations or not. It is a personal *choice* whether one's creative manifestation is original or not, for example. That choice may be consciously made to either conform and please the person's social surroundings, or not to conform its unspoken "rules".

Maturation of the brain comes with limitations and opportunities.

One's capacity for creative thinking matures together with (neuro)physical maturation, and the stage theory of development explains maturational differences in childhood, adolescence, and also in adulthood.

In order to come up with successful solutions, which is for what one is aiming for, **the person may need to conform at least in some level and meet the expectations, or the current trends of sociocultural environment. That type of conforming grows the likelihood that their solution will be heard**. However, I argue that getting a chance to be successful and gaining social validation for one's solution should not happen with the cost of one's own originality—originality, which allows more variety for collectively created solutions.

Enhancing authenticity in both, one's own thinking and personality, requires a hint of creative self-confidence: A childlike courage to present even crazy ideas to other people without being afraid that the ideas will not gain any validation, and at the same time, a considerate usage of grown up and fully operating information processor, that can generate new and original, fully-thought-through solutions. Solutions that may benefit not only our own purposes, but also others around us.

Creativity is a social act.

I consider that almost all truly creative manifestations conducted in the adulthood are socially related and at least somewhat conscious actions. This is because creativity, by definition, is something original, novel and valuable but without the last measure; "valuable", creativity would serve purposefulness only for the creator oneself.

It may be that "contrarians" have an intentional goal to not-to-please other people with their thoughts nor actions which may originate from the need to gain reputation or the need to be heard. However, on the other hand, it can be seen *just an another strategy* how one *prefers* to present their own creative manifestation for the other people—whether it is calculated or not. The goal can be to shake things up, turn things upside down and open other people's eyes. However, **it is about first acknowledging what is conventional, and only after that realisation one can consciously break the conventions**.

The originality of an idea, insight, or a solution is often *a strategic choice* that is made by an individual, and its goal is to be, or create something that is different from the mainstream.

Kids on the other hand may not have a complete understanding what is conventional in the first place, which enables their ability to present unfiltered ideas without a feel of peer pressure, nor the pressure of generating something useful for others. **Kids may not even be completely aware that their creative manifestations differ in any way from the social norms**.

Original thinking may require some originality of a person as well. Moreover, the courage to be an individual who reveals the knowledge that is stored in their emotional and cognitive databases. Creative solutions would benefit greatly from the variety of thoughts created by the people, who are all original at least in that extent that they have gathered and built their unique databases. However, as we age and our surrounding social settings change, the external expectations changes too, and we begin to hide what is in store.

"We all have the capacity to be original, but of course creativity requires more than that.". Creative solutions also have to fit.

Personality theory describes (...) Trait x Scene interaction, the idea being that we have stable traits but they are expressed in different ways in different environments or settings." (Runco 2007, p. 290)

CREATIVE SELF-CONFIDENCE, PEER-SUPPORT AND OPENLY REVEALING THE AUTHENTIC INNERMOST DATA

Peer-support is extremely important at any age, and especially in the adult world. If we do not meet the social expectations about the type of creative thinking that is appreciated at the time, and/or if we fit in too well or the opposite—if we are too controversial—the others may begin to see us as "average", "neglected", or "rejected". In other words, not a creative person.

For an individual, there is a risk to become an outcast, which inhibits an open self-expression and inhibits how one reveal their inner world to the others. For example, it is not appropriate to leave our desks or draw our ideas on office's walls even though we would be asked to "think outside of the box" and deliver original thoughts, is it? If one does all that, or if one differs from the others too much on how they appear, act or how they think, they may not gain social acceptance.

I consider that the reason why we often link sensitivity and mental vulnerability with creativity is because the ones, who were courageous enough to reveal what was in store, set them also easy-targets for social criticism. (Runco 2007)

However, in these cases the criticism is targeted on the person oneself, and not the actual creative product that they created. Or, at least that is how the creator may feel like, because they had created the product from their innermost building blocks.

Creative self-confidence can be a delicate thing, and if it gets multiple hits—and there are many situations where it can get hit by our peers during lifespan—we may start to struggle with bringing out our original thoughts even then, when we are asked to think differently.

Fortunate for more deliberate or rational individuals and their possible lack of creative self-confidence, creativity is not only original nor divergent thinking even though collective creativity, without a doubt, benefits from the originality of an individual too.

At the end of the day, the *value* of insight, an idea, or a solution is always evaluated from outside and by the sociocultural environment. Originality and appropriateness are *both* involved in creativity so in some extent self-control is always needed in creativity too. Runco quotes Frank Barron: "**dare to be a radical, but don't be a damn fool.**". (RUNCO 2007)

In creativity "originality" can be also described as ***controlled imagination*** (CARLSSON 2002), which means that the person is autonomous and confident enough to be original—even weird, as Runco states—but has also ways to control the weirdness, and be realistic.

Controlling one's imagination is the ability to make informed decisions. If a person is too original, too autonomous, and discretion or control are lacking, it can lead to social deviance. In this case, one does not fit in the society, and their behaviour is often seen as undesirable (e.g. prisoners). (RUNCO 2007)

On the other hand, in some situations when we are looking at the diverse groups that are *expected* to generate unforeseen ideas, deviance can be seen as a good thing: For example, in situations where an independent individual, who is comfortable with their own skin and allowed (or even expected) to be highly original, is dropped in the middle of conforming group in order to mix things up. (RUNCO 2007)

However, even in these are knowingly arranged setups, the non-conformist of the group would need healthy creative self-confidence, and an appropriate strategy that their unconventional ideas would be heard and taken seriously by the rest of the group. Being a person who does not fit in by how one thinks or acts does take courage. It requires a personal strategy to be heard even though one would not be socially admired. But what is an appropriate strategy then?

I argue that one strategy to be heard, is the less "forced" or controlled social effort. That strategy comes down to an individual authenticity, and an ability to harness universally shared, built-in human features: Empathy.

I consider empathy as a form of "trait x scene interaction". Therefore, I also consider that it is intrinsic; an evolutionary feature of the human body that enables it to adapt its changing surroundings and varying social settings.

It may be a bit cold-hearted to offer empathy as an effective strategy but that is what it is: An ability to emphasise can expand one's perception and assist with overcoming one's own personal biases. (OWENS 2011; SEPPÄLÄ 2016) (IBID.) Practicing empathy is a personal stragegy in creativity, because it increases the likelihood that other people will find one's creative solution useful for themselves too. It makes creative expression or a product

relatable and familiar, because it was originally made for the other people. The creator was only the one who made the creative outcome available for the others.

No matter how much the modern society might value unconventional thinking, or connect creativity with something different, it must not be forgotten that *ideal* solutions would require systematic, deliberate and conscious approaches as well.

Ideal solutions require an ability to evaluate and estimate, or predict the social judgment. It does not matter whether a person is contrarian or conformist by nature—and in fact, what are considered as "creative personality traits" they are all dichotomous what comes to creative production. Moreover, what would be a "creative personality" is determined by one's own domain. These beliefs that one personality trait would be better for creativity than the other, seem to be influenced by the older studies on creativity, and unfortunately they are very popular especially at work life and in the business world yet today.

Even though the conceptions of creativity have changed in the history, and the concept varies in different sociocultural environments, one thing has not: What matters for the success of a solution are the goals and intentions behind one's creative act.

What has been the purpose of human creativity throughout the ages, is that it has assisted the society to develop. That is what creativity is famous for.

I believe that in the nearby future, the concept of "successful creativity" comes down to universally validated core values, and the societal sense of justice. When creative act is used for a greater good to convey an important message, it is often considered more socially acceptable and has better chances to reach sociocultural validation. This does not mean that the person oneself needs to be remarkably unconventional. More than often it is one's actions that counts.

If eminent creative heroes of the past are looked at from this point of view: How many of them gained social acceptance from the deeds or creative solutions that would not have been beneficial for the rest of the society?

Creativity is an *unselfish* social act.

That said, the negative approaches in persuasion, and getting one's voice heard by using the good old "intimidating tactics" may carry for a while, but it can not have that kind of long-term impact nor widespread success as the positive approaches do. This is because fortunately some things in our physiological embodiment and in the sociocultural environment never change, and the current society do validate similar values as it did in the past. In addition, and maybe most importantly; doing good makes us also feel good because it balances the hectic modern lifestyle that can harm higher-thinking skills. (BREUNING 2016; SONNE & GASH 2018)

Having good intentions towards other fellow human beings seems to be the only common factor that has remained the same within different concepts of creativity.

"A successful creation" has contributed and impacted multiple people's lives. That has enabled the longevity of creative solution.

Could all this also explain why creativity is seen a positive personal trait and an asset yet today? I think that creative act that fulfils all three aspects: Original, novel, and valuable, is not only a social act. I consider that successfully executed creative act that fulfils all the categories is also an unselfish act.

Good intentions that may assist one's ideas to be heard, comes down to the ability to understand and share feelings with others, and understand the variety of unique experiences of others and how they may see the world. If one wills to become the next eminent "creative individual" that can be the first step where they can start from; paying attention that their creation per se and that it is created by keeping the other people in mind.

> The creative product, place, personality, process, and persuasion are the usual categories that are used in the alliterative schemes for categorising creativity research, and the research on adult or eminent creativity is often examined by the product and persuasion. Persuasion meaning the situation when creative person influences the thinking of other people. Even though the more common approach in the studies of children's creativity is to focus on the process itself rather than the product or persuasion skills, also Lau and Li's study suggested that "creative children may manifest a social influence or kind of persuasion". (Runco 2007, p. 64).

The concept of creativity adapts to the sociocultural variables

For many times when human creativity has been tried to explain, the explanations have referred to **an individual creator**—and moreover, to the eminent creative individuals. These individuals have unintentionally established ***a paradox of creative personality traits***, which has puzzled researchers especially in the mid-20th century. When the researchers have investigated e.g. the biographies of the eminent creators, it has been found that there is not one uniform trait that could explain their creative talent. Instead, the personality of eminent creators can be described more like a constellation of different traits. (CSIKSZENTMIHALYI 1996; RUNCO 2007) (IBID.)

Furthermore, what some of the studies suggest is that an archetype of a creative person does not exist. The conceptions on what, or who, is considered creative at each time has developed together with the Zeitgeist. It seems that an individual who became successful creator correlates with the needs of each sociocultural environment—their creation per se was able to reply to the needs of one's social setting. However, what comes to labeling any kind of "creative personalities", they have not exactly determined who was put in the limelight. In addition, not all eminent creators were exactly popular in eyes of the society either.

Runco explains how "some of the traits (…) of creativity are admirable, respectable, and socially desirable. Some of them are often unattractive and low in social desirability." (RUNCO 2007, P. 316).

> "(…) no wonder creative children are consistently favoured by teachers" at the current time. (RUNCO 2007, P. 316)

Creativity per se, has became a personality trait which causes a lot of misunderstandings what creativity is actually about. However, personality is not completely stable element that would remain the same during the whole lifespan. It changes over maturation, and adapts just like the Trait x Scene explains how we adapt ourselves in particular social situations. Even our behaviour is not consistent in the day-to-day life. (RUNCO 2007)

Particular characteristics of a person that are appreciated in different times, and in different societies, are highly dependent on the sociocultural environment. The development in the theories of creativity, and with the depictions of the creative people, suggests that there is an evolutionary development involved with the whole phenomenon of creativity.

WHAT DOES THE SOCIOCULTURAL ENVIRONMENT EXPECT FROM CREATIVE INDIVIDUALS?

I am sure there is a proper term in social psychology for this "reversed trait x scene", e.g. social metacognition, but in much larger scale.

I would like to expand the idea of Trait x Scene into **Reversed Trait x Scene**. When I begun investigating "what is creativity" from the sociocultural perspective, and who may have the privilege to have the honour to express it, I soon noticed that it is not enough to look at an individual characteristics (or behaviour) in particular surroundings.

None of the theories did not explain why some people manifest their creative potential more freely than someone else. Moreover, because none of the theories provided an explanation what is human creativity, I had to turn the focus on external factors with this matter. I realised that explaining the issue why creativity is not equally accessible for everyone would require investigating how one's *surroundings* perceives the person oneself (i.e. social metacognition determining one's social status).

For example, like the chapters on developmental theories explained, the expectations towards individual's creative abilities do not remain the same nor consistent. The idea what is expected from a kid or young creative is completely different from what is expected from an adult creator. Moreover, even that what is expected from an adult creator varies according to the social setting.

I have observed that even the trained creators are not "allowed" to behave consistently in all settings (e.g. pitching). When the social setting changes, the expectations towards creative individuals change as well.

(The utopia of) creativity-friendly environment would appreciate the variety of personalities that are all able to create ideal solutions.

In order to create ideal solutions we would need all kinds of people and personalities. I believe that *an ideal solution* cannot arise solely from one person. An innovation is always a mix of ideas, idea generators, and evaluators. The more the merrier.

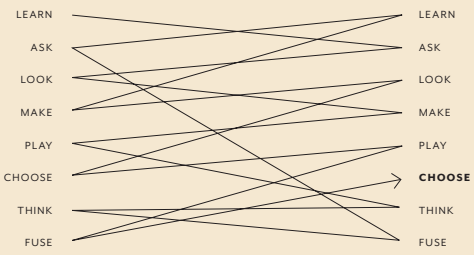
Surely, an individual person can come up with an innovation. It would demand training one's tactics in insightful information processing, which is not rocket science: It would require perception and knowledge; enhancing cognition and expertise, and then the last but not least; it would require *enough time* to develop that innovation. However, many people seem to think that creativity manifests without any effort, and all the most impactful ideas have been generated effortlessly, by a fortunate coincidence. Furthermore, many people seem to think that famous creations were developed only by a single person alone.

Keith Sawyer (2013) explains that an individual's creative process does not work like that. In his book "Zig Zag: The Surprising Path to Greater Creativity", he explains *why* creativity is not a linear process and why zig zagging between different steps of the process is far more beneficial for the creative outcome.

"It's a handbook of proven techniques, based in solid scientific research about creativity and the brain." (SAWYER 2013, ZIG ZAG)

Zig Zag by Sawyer.

Adapted from Sawyer 2013, p. 8



However, the messages that the eminent creators' stories are sending is not that. The heroic stories do not often tell that how much work and effort Mad Geniuses put in, nor that if some of them were devastated by a heartbreak which made their creative thinking suffer and the process to a halt. I believe that among the public, this would not make the story as popular as the depictions of a mysterious superhuman do. Moreover, the story that goes viral is often a story that the public absorbs.

The eminent creators also had the same shortcomings as human beings as we do today—all great minds think alike at the end of the day. However, the environment where we live in today is completely different from Mad Geniuses', who lived in the world where the Industrial Revolution was just about to kickoff.

Furthermore, what the variety of eminently creative heroes from the past show is that all of their paradoxical personalities contributed to a greater good in different ways. **There is not only one way to be creative**. We would need people who look at things from different perspectives in order to make the world a bit better—and making the world a bit better is exactly for what human creativity is meant for. Hence, creativity does not always have to lead to an innovation.

I believe that the paradigm shift in creativity can lie in people's actions—in creativity that manifests in various ways, and has its core in the diversity of individual personalities. In creativity, the richness of different ~~personalities~~ perceptions should be seen as an opportunity because we all naturally gather highly personal data; a variety of emotional and cognitive knowledge that benefits one with generating creative insights.

If all that data could be brought together, and if there was no social limitations how creativity should, or can, be expressed at each stage in life, or in different social settings—the only thing that would then matter, is what the individuals are doing, and how one takes an advantage of everything they have learned until that point. We would put our (wise) heads together.

However, that seems to remain an utopia for collectively created solutions, because it is rather easy to form an own vision that is based on what-went-viral instead of gathering more information before coming up with an idea. **Developing solutions demands effort**. On top of that, it demands **courage to communicate** those personally matured ideas for the others, and then it all comes down to creative self-confidence.

Our creative self-confidence has built over time and maturation through "development, education, and day-to-day experience" (RUNCO 2007, P. 321). There are many external variables, constraints, pitfalls and boosts, that have defined the level of one's creative self-confidence (i.e. resilience saboteurs, and internal and external constraints). (SEPPÄLÄ 2016; OWENS 2011)

It does make a difference whether or not one's creative potential has been acknowledged and supported in one's life.

So what if someone's peers saw them as an average fellow when they were young? What if the person has always felt unconsciously (or consciously) that they themselves, or their actions, do not fit in at all? Was there something about their actions that were not socially accepted, or is it possible that the expectations of one's social surroundings did not simply match on what behaviour was arising naturally from their personality? **Can that explain *why* some people's creative self-confidence is lowered, which inhibits then the expression of their creative abilities—that: *How* the creative self-confidence has had multiple hits in the past?**

It may be true that our genetic inheritance and the past experiences shape the image of creative self, and that the society kills creativity as we grow up (i.e. prevents us to tap into our inner worlds), but I would not shift the responsibility of becoming aware about personal biases completely away from an individual.

Boosting creative self-confidence requires an ability to self-reflect. Boosting one's own creative potential requires conscious decisions, and an understanding how one's own insightful thinking works.

MAKING THE CONSCIOUS DECISIONS WITH WHAT TO CONFORM AND WITH WHAT NOT: SOCIAL ADMIRATION AND THE LACK OF SUPPORT

> At the very early phase of this study I did a serious checkup about my choices, values and motivations, and all the things I had ever learned about creativity and how they may rise or lower or inhibit my courage to create. I questioned my upbringing, I questioned my teachers and mentors, I questioned my coworkers and peers.
>
> Why I never felt like really fitting in? What things or situations in particular arouse negative self-talk that made me question my creative potential or me as I am (a creative individual)?
>
> Why, for example, my fellow designers appreciate my "creative" talent while the others look down on them? Why so many people consider my career "cool" and their own jobs less cool, and why some think my job is not "a real job" or a way to make a living?
>
> It was my sociocultural environment that defined all that—it was not me. I have a social status but the admiration of that status depends with whom I am speaking with. It is not a stable concept about my own self. That is a paradox.

To be clear, at that point I was not aware that my self-reflections are going to become my master's thesis one day. I believe there was two **"crystallising moments"** (Runco 2007) for me and for this study: The first was in 2013 or 2014 when my yoga teacher told how this one particular asana is believed to assist with creative thinking, and boost alpha waves in the brain. I knew nothing about the brain waves, and that is when I got interested in neuroscientific studies on creativity.

The second moment dates back to summer 2014 when I was working with Sunshine Foundation in Nagpur. In Nagpur I had a glimpse of what is profound happiness. It was that kind of happiness that made me perceive all the things that I was not happy about in my "other", regular life. Without these two **personal insights** it would have been a close call, that I did not quit my career as a designer who had blindly pursued that career for over half of her life. I somehow wanted to give all those experiences and knowledge back for these particular people, and offer that also for the others.

I have met several eminent creatives who are still struggling with the same issues that I have struggled. However, I only begun to pay attention to that issue after my own crystallising moments. Some of these people have built their careers in the "creative" industry even decades and yet, they are puzzled why their own creative self does not match with the expectations either at the field, or when interacting with "regular" people.

An individual can have a major effect on oneself, and with building and reshaping their own worldview. It can be seen as an individual responsibility in the metacognitive process of creative self-confidence; that *how* one establishes their cognitive and emotional databases—what is in store. Resilience and self-control over the data forms stable creative self-confidence of which any external factor can not have much impact on.

Runco states that self-reflection can be practiced especially in the adulthood, since children may not have proper self-reflection skills as adults do (RUNCO 2007). If one is willing to harness their own creative potential there are no excuses to do so, no matter how much individual or sociocultural limitations there may be.

That is why the metacognitive process in creative self-confidence begins from (rather harsh) self-reflection, and from the inner motivation to develop oneself as a creative individual. It also starts from asking that, **creativity-wise, what we do idealise in the society and how would we, as creators, like to be seen?**

The neurobiological studies show that not all our behaviour is under our control. Unless we do consciously pay attention on our behaviour, the boundaries of genetics and primitive thinking patterns determine who we are. Also, there is no space for new information (in this case, about creativity per se) that can be added to our knowledge base either. Creative potential can not be fulfilled if a person is not putting any effort into it (RUNCO 2007, P. 316).

Creativity is not something
that you have, or you don't.

Creativity is, at least in some sense, social
human behaviour and one's input on that
can be enhanced and maximised.

Boosting creative self-confidence can
benefit both, an individual and the society.

Searching & playing with data in the Big Data Age: Put your half-baked ideas out there and dare to ask advice

Besides there is a vast amount of knowledge that is available, sometimes, it is not so clear what to look for. If there is not that type of knowledge available in your head (i.e. expertise) that would qualify you to seek answers for you puzzling half-baked ideas, the vastness of data makes it difficult to evaluate all that information on your own.

During this study I have had several questions and mini-insights about the new things that I had learn about the brain. For most of these questions I was able to check online (in a matter of minutes) if they were just products of my own mind, or if they have a base in science. After investigating the reliability of these online findings, for most of my questions I was able to find a closure. It was delightful to find out, that even for the most random questions I have had along the way, there was always someone else, a professional from the field who had addressed the same question.

However, there was one open-ended question that I could not find an answer. I want to share that question because I truly believe that no-idea is worse than a wrong idea. This half-baked why-not-idea may be erroneous from the beginning (or is not, I do not know), but its mistakes may fulfil someone else's half-baked idea. Moreover, the is zero impact if new data does not exist and it is not communicated.

ANOTHER WHAT-IF IDEA THAT HAS BEEN BUBBLING IN MY MIND

> Can generating creative insights be like the Newton's 3rd Law, that for every action, there is an equal or opposite reaction? That only some of the four neural circuits that Dietrich hypothesised is stronger than the other? Would that explain why some people appear e.g. more spontaneous and the other more deliberate, or why some of the people express their creativity without any inhibition and some may be more considerate with their expression?
>
> **Runco pointed out that "each of us has creative talents, but not everyone can be Einstein", and that "each of us has [creative] potentials to fulfil, but the range of potentials varies from individual to individual. That is the contribution of biology, genes, and nurture." (Runco 2007, p. 40–41).**

I had been reading a whole lot about all of those things as I had been learning about the phenomenon of creativity, but what I did not find is that **can social conventions affect on the individual's neural circuits** per se. If they can, that could explain a few cultural differences in people's behaviour, or e.g. why some of the sociocultural environments are producing a larger amount of innovations than the other (that matter is far more complex, though).

Furthermore, Runco's lines raised a question in me that how much of the creative capacity is actually defined when we are born, and is it possible that sociocultural environment influences not only on person's expression and creative potential (e.g. education), but can the sociocultural environment even shape the neural circuits in the brain in a (neuro) physiological level? Can sociocultural environment contribute on that, and if so, then in to what extent?

Seppälä (2016) has pointed out that at educational institutes we mostly learn how think linearly (i.e. deliberate data processing) which may affect on our ability to think creatively (i.e. spontaneous data processing). Another study, called "The Creativity Crisis" (2011) by Dr. Kyung Hee Kim, also suggested similar results. The study found out that as the **IQ scores increased the ~~creative~~ non-linear thinking scores simultaneously declined**. (KIM 2011; SEPPÄLÄ 2016) (IBID.) "The conclusion was that people in general are becoming less able to think creatively, and they are less tolerant of creativity and creative people." (SEPPÄLÄ 2016, P. 104)

"THE CREATIVITY CRISIS: THE DECREASE IN CREATIVE DIVERGENT THINKING SCORES ON THE TORRANCE TESTS OF CREATIVE THINKING"

> The study sample involved six normative samples of 272,599 kindergarteners through 12th grade students and adults between years 1990–2010. Creative thinking was measured by Torrance Test of Creative Thinking (Kim 2011).
>
> However, TTCT measures non-linear, divergent thinking, even though the researchers have acknowledged that creative insights and solutions require also social judgment and deliberation. (Dietrich 2004; Runco 2007) (ibid.)

Can generating creative insights be like the Newton's 3rd Law; that for every action, there is an equal or opposite reaction, and so is it possible that we are born with rather ***equally strong neural pathways*** that are responsible for generating creative insights?

Is that why kids seem to be so comfortable with the outcomes, that their mind effortlessly generates? And ***what if***, as an adult, you yet again were able to tap into that kind of insightful thinking by training?

What would happen to ***the quality of creative solutions*** that are generated in the adulthood, if the neural circuits that are responsible for creative insights, were somewhat in balance and equally strong?

From these questions my mind developed its own little theory about "the possible sociocultural impact on which neural circuits are strengthened during one's maturation" (to put it in a nutshell): In order to use one's own full capacity in generating creative insights, it would require neural enhancement, and that an individual strengthens all four circuits.

However, that would also require an encouragement from the others to do so. In the light of developmental studies, if peers validate e.g. reason over emotion, it may be likely that the person subconsciously strengthens those particular circuits instead of creating a natural balance between both databases and processing modes. **Does the sociocultural environment, and its conventions and expectations, determine how these four neural circuits develop during maturation?**

I knew I needed to find a study that would involve a study sample of the least biased individuals; very young children. In comparison to the studies that I had already found (e.g. about training divergent thinking skills), I was looking for a study that involved children at their pre-conventional stage—a developmental stage, before we have entered in the world full of expectations, and before we are fully able to adapt in the social settings (i.e. way before PFC is fully matured).

A study with little people, who can communicate but are missing the "social filter" from their original, creative thoughts. I kept getting zero hits, and decided to contact Ph.D. Roger E. Beaty from Penn State University with my funny idea *(and that—I tell you—took me a half a day to build the courage to just send that message, because I am not an expert with these things).*

Beaty's lab (beatylab.org) has been studying **divergent thinking and neural networks involved in original thinking**. Beaty had wrote an article about how e.g. creative hobbies can enforce the neural connections in the brain that are also needed for original thinking. I found that article, and that is how I found his email address.

In the article Beaty concludes his group's findings, that **"(...) the creative brain is 'wired' differently and that creative people are better able to engage brain systems that don't typically work together"** (i.e. the default, salience and executive networks) (Beaty 2018). His group's findings are indicating consistency with other neuroscientific researches that have included both creatively-trained and non-trained people (e.g. Andrey Rodionov's study on actors and non-actors).

However, besides these recent findings that applies to adult creators are crucial information what comes to creative training, my questions were not fulfilled. My paper will be still missing that one piece of information that what does the brain activity look like when tiny people generate creative insights. However, there are no studies like that. Neuroscientific studies on creativity are yet very new field of study. Beaty (2019) kindly replied to me, and even gave his advice of the few other studies that I could give a look:

"The neurodevelopment of creative thinking is an interesting but understudied topic, as you're probably discovering. Maybe you've already come across a handful of fMRI studies with adolescents (…).

As far as I know the youngest age group to have been studied using brain imaging are teenagers.

It would be really interesting to see how brain network maturation tracks changes in creative thinking in younger children but I don't think anyone has looked at this yet." (BEATY 2019)

There is a lot of pieces missing from the puzzle of creativity. My own wild theory can be right, even though it will most likely be wrong. That is not the point, though. In his article Beaty states that even the studies that includes the adult sample, would need further investigations: The "***future research is needed*** to determine whether these networks are malleable or relatively fixed." (Beaty 2018).

Taking it into account that humans are also just natural organisms that are vulnerable to stimuli and interacting with other organisms, and even if these factors could explain why some people becomes Einsteins or Picassos and some do not, the thing is that **there is still a lot that we do not know about human creativity**. We are still exploring.

I believe that the environment where we were brought up, and where we live right now, plays a great role whether an individual creative potential can flourish. The current environment where we live at right now, provides us an astonishing amount of building blocks for generating creative insights—***data***. However, not all the pieces of information do good for creative self-confidence, or for recognising an individual creative potential.

That type of data that makes one doubt their own creativity should be filtered extra carefully.

Questioning the data at the Big Data Age

ORIGINALITY BIAS; THE WHAT-IS-USUAL-IS-NOT-CREATIVE CONTROVERSY—IS THERE ONLY SPACE FOR EXCEPTIONAL UNCONVENTIONALITY IN CREATIVITY?

In March 2019, I was listening the talks at Vuoden Huiput Festival, and I paid an extra attention how *the creatives* themselves communicate about creativity; or what is cool at the field that is often associated with the *greater* creativity. In his talk, "Make More Sense With Nonsense" (2019), Erik Kessels emphasising that how he does advertising, is that he makes deliberate choices that can be considered social mistakes.

He noted that in order to stand out and to do something different one may want to ***"be the worst"*** instead of trying to the best, because latter is what ***the others*** are trying to do. Kessels' work and actions may represent the non-conventional, even a bit rebellious way of thinking. Without a doubt—and more than often—that "something different" can inspire, amuse, and intrigue a wider audience because it effectively catches the people's attention. However, I see a slight division at the design field.

The other half of creatives is using universally shared, generalised human features, and familiar or relatable approaches in order to push their ideas through. These approaches do not lean on "being different" or "thinking in an unconventional way" but instead, the main goal is to create something ***functional***. Something, that makes the masses of people to relate with the presented data. A familiar pattern that is easy to perceive, and something, that is as ***useful*** as it can be as for many people as possible. This approach *could* be easily considered an end-result of the mass produced goods but the world has changed a lot since the Industrial Revolution begun, so it is not that.

Ersin Han Ersin from Marshmallow Laser Feast represented this type of shift in approaches—hypothetically, a new wave of creativity. His talk "Making the Invisible Visible" (2019), was about the collective's mission to convey messages about the environment, and trying to make people to relate back to the nature through holistic virtual reality experiences.

> The VR experience basically takes an advantage of common human biology; our natural senses and embodiment that are stimulated during an experience. Instead of aiming for a "shock reaction" that easily catches people's attention, the design is based on the things that profoundly connects all of us humans, and things that one can easily relate to. That design communicates directly with the built-in features of the human embodiment.

Furthermore, developing this type of experiences requires an understanding of what the others may be feeling or thinking (i.e. empathy). Some features in the embodiment are universal, which enables global communication and interaction, and which may be just as powerful tools to speak to a wider audience as is the tactic to create something surprising. Practicing empathy is one powerful way to create, even though the creation itself would not instantly tickle the cerebellum like unusual things most often does.

Our beautifully flawed bodies makes the great minds think alike and also to feel the same.

I hypothesise that in the future creative solutions' level of impact will not be measured by how original or unconventional the idea or the product is. In the future the success in creativity may be measured by **how well the solution communicates with universally shared core values and the basic human features**. Regardless, that may be the main function of creativity: Making an impact on others. That may be why creativity is seen an asset in so many levels.

Strategies to be heard and making an impact: How did the eminent creatives do it?

Both of these previously mentioned ways of Kessels' and Marshmellow Laser Feast can be seen as forms of self-controlled persuasion (i.e. "dare to be a radical, but don't be a damn fool"). They are strategies that aim to have an impact to the society, and ways to get the message through. However,—considering the long-term impact that one may want to have—it is more likely that an unselfish creative act becomes more valuable and useful to a wider audience, than generating something that has onetime wow-effect.

> **Creativity is not about the personality per se, and eminent creative people from the past also proves that. In fact, many of the "creative characteristics" depended on their values, intentions, and choice.** "Many eminent famous creators might have been promoting themselves by saying self-defacing things and presenting a modest persona. Mozart exemplifies this. He had a reputation for composing without rough drafts and only in final form, but evidence suggests that he actually went through many early versions of his compositions (Cropley et al., in press). Mozart may have been manipulating his public persona." (Runco 2007, p. 302)

This is one famous misconception among the public: That creativity manifests spontaneously that creates solutions or tangible objects, that are already ready when the idea popped in mind in the first place. Bibliographic studies have shown that many eminent creators simply depicted their creative manifestations like that—intentionally. Sawyer (2006) gives another example of a famous Expressionist from the 1950's: Jackson Pollock. Even though Pollock claimed that his works are born from pure emotion and inspiration, the art experts at the time were aware that it was untrue. The abstract Expressionists adored the Romanticist era when it was believed that all the successful creations are a result of an individual's high-intensity emotions.

However, Pollock's techniques demanded a lot of practice, and like Sawyer points out, Pollock's works were "carefully planned and composed (…) and he composed his works in advance so that would give the appearance of maximum spontaneity." (SAWYER 2006, P. 17). Creativity is a process which requires both spontaneity and deliberation. Anyone can come up with dozens of ideas—or, we can create multiple ideas in half an hour design sprints—but that does not yet mean that the creation would become great or successful. Productivity thinking is poisonous for high-quality solutions, and so are the misconceptions on eminent creators.

Runco presents different ways of the impression management: "Individuals can decide to be proactive, for example, and they can direct energy and resources to self-efficacy. They can control weirdness." (RUNCO 2007, P. 316). ***Contrarianism***, which can also be called pseudocreative behaviour, can be useful for creative work depending on individual's intentions and whether they only want to use this tactic to gain publicity, or to value creativity in its more traditional sense. For some eminently creative people—contrarians or not—attention or admiration were not as important.

When comparing the famous self-promoted creators like Picasso, Stravinsky, Gandhi, Freud and Einstein, to other creators like Bob Dylan,

Feynman and Darwin who did not value self-promotion, nor were valued by non-eminent people, one can notice that there were completely different intentions as well: The first group tried to attract attention in order to get their message through, whereas the latter developed their skills and knowledge—information that would also allow practicing ***authentic and intrinsic creativity***. (RUNCO 2007)

Despite of the different content in their affective knowledge bases—in other words, motivations and strategies, the people in both groups have became famous for their creative actions partly because they had established their own ***creativity-friendly environments***.

The creative success does depend on free will and the choices that we make. If one intentionally searches and selects a supporting environment for their creativity, it may assist to develop their own creativity. That is when "the person finds the right places, settings, and collaborators or mentors" (RUNCO 2007, P. 321).

But what if one does not find their own zone, nor peers, who would support their authentic creativity?

Or, what if they do not even recognise their own potential because they associate creativity with misunderstood features, or a talent that they do not (yet) possess?

CREATIVE SELF-CONFIDENCE AND THE PERSONAL GOALS TO AIM FOR A BREAKTHROUGH

I want to be clear that the concept of Metacognitive Process in Creative Self-Confidence does not put emphasis on the individual's possible goal to create the next big C. Instead, the main aim is to provide insight that even the insignificant ideas can grow and contribute to major breakthroughs—but only if the person is courageous enough to present their ideas out loud. That is the butterfly effect that all great inventions seem to have had: One idea has led to another, or someone's thoughts fulfilled someone else's.

However, without a firm sense of (creative) self we tend to keep our thoughts and ideas to ourselves. Whether or not the idea gets validation is not only in the hands of an individual—that is why "greater" creativity is always a social act at least in some extent. Yet, without the courage to bring one's ideas into the light and for a wider audience, the ideal solutions cannot be found neither.

The lack of creative self-confidence: A Story of Woodchopper-Caretaker

> When I hear people repeating mantras like "I am not creative enough" or "I've always wanted to do something more creative", it often sounds like they consider themselves almost less of a person. Also, an interesting annotation is, that sometimes these same sentences are coming from established artists and designers. If not them, then who are the ones that society considers "creative people"? Haven't they already had their reassurance about their creative skills when they have managed to establish a creative career at the fields that are traditionally considered highly creative?

This is what *I* learned about inhibition, the lack of creative self-confidence, and what happens to creative self-confidence (and taking creative potential in use) if a person links creativity to artistic talent and originality—this example explains how social conventions can sabotage an attempt to harness creativity of the whole population.

In the halfway of my study I had casual chat with a man who worked as a woodchopper man on summertime and a caretaker for elderly people on winters. However, he had always wanted to become a garden designer. To me he said that the reason why did not, is that he did not consider himself creative enough. He also pointed out that what he is doing now, is not creative at all. After a while of chatting with him I told him about my study, and my own point of view about his creative potential and capacity.

I unveiled everything I had learned about creativity at that point, and explained him that I believe that both of his current occupations demanded high levels of expertise and skills that he is already combining in creative ways. I explained that the knowledge that he has gained, and the ways he comes up with in the social situations with the elderly people demands creative abilities*—for example, every tree that falls down demands careful planning, and every elder he works with demands coming up with an unique way of adapting the treatment, which can be even as simple as finding a way to communicate with the person.

* Interestingly a woman from my ceramics class, who works with asylum seekers; interacts with several people everyday, described her flow state from this point of view: When a conversation gets really going and feels effortless, she tends to lose the track of time, and gets almost intoxicated of this successful social interaction—that is what flow means to her.

It soon became obvious that he had gained his knowledge through the years, through experience, and that had helped him to develop his skills. He had became an expert in both fields. I asked: "Who taught you all that?" and he replied that he had mostly gained the knowledge from figuring the right approaches by himself—and most importantly by doing things that met his values and his love for outdoors.

I think one common error is that we often link creativity to big breakthroughs and learned (artistic) talents, even though human creativity can be seen everywhere and everyday. We just do not give enough credit for the magnificent unit that we carry between our shoulders—the unit that makes us all insightful individuals.

However, what disturbed me with the chat with the woodchopper-caretaker was that at least not until that day, he had not shared his work-

related insights with anyone. Until that day he had not thought that his ideas could benefit someone else, or solve even bigger issues, because he considered himself just being part of the "working-class", and not one of the white-collars who are making all the decisions (i.e. the creative elite).

At the end of our discussion he told me that he is utterly grateful for finding a new perspective that gave him a boost. He admitted that there is a possibility that he already has what it takes to be "creative". Someone, who could have a bigger impact at both of his fields by his ideas and expertise—and that maybe he even has the courage to pursue his long-term dream of becoming a garden designer.

When someone compares one's own creativity to for example eminent creators', it is always just a half a story.

It can be difficult to relate to these people, if one's own creative manifestations do not match with the established creators.

The misconceptions and deeply rooted biases about creativity can make us unable to recognise our own potential.

> I keep telling the story of woodchopper-caretaker, because I think it points out few key issues about creativity. Not only that creativity is difficult to define but also, that creativity is entangled with myths and biases yet today. These ideas about creativity per se may decrease an individual creative self-confidence. The person does not even recognise how their creativity manifests.
>
> They are lacking the reassurance that they already have the potential, and they are just unable to recognise it. Because there is not only one type of creativity—instead, it manifests in various ways—I think it is important to acknowledge how one's mind already generates insights even though the situation nor the manner that how it occurs, would not be considered creative in a traditional sense.

The idea of who is creative

> When I investigated creative personality traits (i.e. indicative and contraindicative traits) (Runco 2007) in the light of neurobiological, developmental, and sociological perspectives the recipe for creative self-confidence begun to form. I realised that it is not only me, who is comparing her creative self to the others, but that many people hold this vague idea about who is ought to be creative. What I also found out, is that various different "creative tendencies" or personalities are dichotomous. They all have their silverlinings what comes to the whole creative process per se.

Creativity is by definition an intrinsic feature that we all possess. Why woodchopper–caretaker did not consider himself creative? Would he be more aware about his creative capacity if he had been taught about the phenomenon of human creativity at early age? That, for example, creative thinking occurs in the brain through four neural circuits, and that he is actually already using them in a flexible manner at both of his jobs.

Why he was lacking creative self-confidence—that prevented him to acknowledge his potential, and moreover, prevented him to take an action of expressing his ideas to others?

It became obvious that he was not aware that he had already formed an individual creative "expression" even though it was not an artistic expression. This personally established *idea* about creativity; that creativity is only about an artistic tendency or an artistic career, had influenced how he saw himself as a creative person. He did not fulfil the classic characteristics of a creative person neither (i.e. could not relate to any of the idols of creativity). This had made him doubt his own creative capacity. In fact, he described himself as someone "not-so special".

I wanted to give a closer look what the sources that I had gathered has to say. What makes so many people—including woodchopper–caretaker and I—think that we are not creative or not creative enough. And why we compare ourselves to the others so much even when harnessing the collective creative capacity is at stake?

The image of self develops as we mature: The strength of creative self may be deeply rooted to the others around us and their validation (i.e. peer support)—like it is said; the apple does not fall far from the tree. However, what I found out, there can be more to it why someone does

not recognise their potential. That is how the sociocultural environment builds the stereotypes of eminent creators yet today. It is not only that they are often depicted in a favourable limelight, but also that they are a bit mystical characters, or who possess superhuman powers. Moreover, none of us have those superpowers. **What is even worse (for creative self-confidence) is that the way of how eminent creators have been depicted and idolised seem to have long roots in the history**. All the messages about the phenomenon of creativity that were sent in the history are very much the messages that are seen in the headlines today. If you turn that information into bytes again, then think how strong subconscious messages for example idolising or romanticing the eminent creators can send, if the person do not perceive as they are—just glimpses of data, and glimpses of the full story?

Yet again, bearing in mind that the human brain constantly selects, filters and records external stimuli, and that the strongest information survives, there is a strong suggestion that the biases about creativity are maintained by the popular media and by the human-to-human communication. It is rather unlikely that someone would "just bump into Dietrich's study" if there was no special personal motivation or intention to seek that information. Yet, the latest discourses about creativity, the theories and the findings, have been available since the late 1990's. Why they are not a common knowledge by now?

People interact with the sociocultural environment and vice versa.

However, taking it into account that as the individuals and their environment evolve, also the information that we have available evolves—and it made me wonder, that is there a possibility that perhaps the tendency to seek familiar data is also what is making us to repeat "wrong" information time after time?

Or is it possible that some things are simply evolving slower than others in the sociocultural environment (like the most popular ideas about creativity)? For example, even though the field of neuroscience has developed together with technology (i.e. neuroimaging techniques) and it is an evolving field, yet their findings are not reaching the public widely enough for some reason.

Considering that for example Dietrich's paper was published 15 years ago, and after that there has been several similar studies, why people are not informed about these studies when some other information can spread in a millisecond and reach the whole global community? I believe the findings from neurobiological studies can explain much more than just individual limitations in perception, for example. It explains how the social cognition develops—that is because all of us have those same limitations.

Why the general knowledge about creativity is dragging behind, and is more than often not up to date?

Or are we repeating the latest findings about creativity somehow in a wrong way, and is that why it feels less familiar or less interesting?

SOCIOCULTURAL FACTORS IMPACT ON AN INDIVIDUAL
—and vice versa.

Who has the most impactful voice in the world today?

Sociocultural environment interacts with individuals and individuals shape the sociocultural environment. In other words; as us individuals shape the environment we live in, the environment shapes us too—also, our shared (social) identity. Sociocultural factors can impact how one's creative self has been established and some of the variables can be harmful for creative self-confidence.

The popular ideas about creativity are often contaminated by old myths and outdated theories, pseudoscientific creativity tests and articles, and most recently; the social media is stirring up the whole picture of the phenomenon of creativity. The dated "knowledge" is widespread and very much alive and kicking still today. It impacts on general discourse about creativity which yet again, in some cases can have negative influence on an individual who is trying to recognise their own creative potential.

The vagueness of the phenomenon allows multiple interpretations.

Whereas false knowledge keeps on spreading the empirical results in creativity research do not make it to the headlines so often. Problem might not be only the funding issues that creativity research is facing, nor the limitations of modern technology and the issues to measure human creativity. It might be the fact that we simply do not know enough about creativity yet, and all the things that we *do* know can be tricky to communicate for larger audiences. It is not surprising that the most popular opinion about creativity is still formed by misconceptions, and from the diversity of creativity theories' results.

In addition, even though popular media (and the people) seems to be more and more aware about the downsides of productive-thinking, the phenomenon of creativity however, remains vague. The closer we have got to the next decade, the year 2020, I have noticed that different facets are trying their best to tell people that they should pay attention on rest and having breaks. They are telling why stress is harmful. What they also tell that these things improve creativity, but yet, people can not really define creativity or it can mean several things and the explanations vary according to who you ask. **These stories do not tell clearly what creativity has to do with sleep, having breaks in silence, or with avoiding stress, and the phenomenon remains vague to the most of the people**.

Sometimes the data can become distorted by the people who are making their living in *the field of creativity.*

Some creatives like to preach about their creative characteristics, or special and a bit eccentric habits, and their exceptional talents that have enabled their creative accomplishments. However, even though at first glance all that may seem genuine (as it does enforce the classic pattern of a creative person), but how someone can tell for sure—for example, the average Joes or regular Janes—if the creator is only using these stories as a strategy of self-promotion? I believe that the way of how the creatives themselves communicate about their own creative potential can also expand the gap between the "regular" people and creatives. Fortunately there are a few modern Mad Geniuses who have emphasised their ordinary human traits publicly and underlined that there is nothing superhuman or extraordinary about creativity (e.g. Steve Jobs).

However, even more often than "just sometimes" individuals who are involved in creativity business are embraced by the popular media, and a wider audience looks up to them with an admiration. I argue that eminent creators are not depicted just as regular people in today's popular media even though they would like to, bar none. These stories are very often garnished with extra elements, and there is a good reason for that.

The value of these stories is measured by how many times it is viewed, or how many likes it gains—our modern stories have to attract as many people as possible in a sense that the story can considered successful. The more popular the story is, and the more often it is posted, the more high up algorithms push it. Anything that goes viral, is a level up for spreading information that may have been false from the beginning. However, I believe that there is a lot of people who underestimates the power of the information on their own perception.

Even though the present-day creativity researchers are doing their best to offer their most recent findings on silver plates—the findings that could correct biased and outdated information—these scientific papers are not easy to read. For instance, for that reason they are often simplified or falsely interpreted. Scientific papers are not as *media sexy* as for example, the image that movies or social media articles are trying to paint of the eminent creators. Scientific results are not attractive stories like that.

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However, some of these "real stories" about the brain and creativity have been available since late 20th century—almost thirty years. The decade between 1990 and 2000 was declared "The Decade of the Brain" in the United States (KALBFLEISCH 2012) and the human brain is still a trendy topic. However, what is bad for the creative brain, within the last thirty years especially, creativity has became a business.

People seem to be willing to pay someone else for enhancing their creativity, and there are numerous options available that all promise to enhance the individual's creative potential. The literature on creativity that is available today, makes no difference. If one goes through all this knowledge then how someone is suppose to *know* what is real information and what is not? How can *anyone* know what to swallow and what not because there is so much knowledge about creativity?

It may be difficult to recognise what really has been fed to us from the endless feed of external stimuli and information, if there is no time to stop and evaluate that data.

Some of the stories on eminent creators can have a high value for media, even though at the same time these stories keep shutting out the majority of "regular" people. For them creativity becomes something that is out of their own reach.

"Experimental research has shown that people are generally more likely to believe research findings when they are accompanied by brain images and neuroscience explanations, even when these are incorrect. (…) Furthermore it may be difficult for people who lack neuroscientific expertise to recognise misconceptions about brain research in the popular media. Information provided by the popular media is often over-simplified or over-interpreted, as the popular media aims to reach many people. Therefore, popular media have been held responsible for creating misconceptions." (DEKKER ET AL. 2012, P. 7).

Miscommunicated data keep immobilising the efforts to turn creativity into what that it actually is—something, that is just as ordinary and necessary human function as eating and sleeping are.

What is more, I would also like to argue that it is unlikely that either the people in creativity coaching business, or media, would be always *intentionally* spreading biased data or false knowledge about creativity. It can be not intentional because of the very human factors (i.e. the brain glitches). It can be because every piece of information that is out there has been generated by a human being who is always limited to process information—it might be that none of these people were aware that they would generate poisonous information for the other people to find. It might be that people at the business genuinely think that they releasing just another harmless article about Mad Genius' daily habits, just to inspire people who struggle with their own creativity (or productivity). But are these stories completely harmless?

Creativity business would not bloom today, if the previous studies that were made on creativity would not have had an impact on a wider audience. It seems that already the mid-20th century creativity studies became trendy topics among the regular people as well. Creativity was seen as a tool for a societal change and power, especially in the US (e.g. dominance in space exploration, i.e. an economic asset)—where most of the research on creativity has been done as well. Popular media tried to catch the essence of these studies, but at that time the stories focused mainly on the eminent creators—individuals with extraordinary capabilities.

The unexplainable phenomena and unsolved mysteries intrigue people. They always have. What is more, is that people are also intrigued to know whether they themselves possess the magical power of creativity too.

There are numerous tests that measure creativity and that can be found online too. (Hence, it is more than likely that the ones that appear to social media feed are not reliable.) Majority of the *real* tests were developed in mid-20th century, and some of them are still in use. At the field of modern creativity research, as well. However, many of these tests and studies are acknowledgedly limited, but their limitations per se, are not usually informed in popular media.

Even though they are often called "creativity tests" many of them measure divergent thinking skills (e.g. Torrance Test of Creative Thinking). Some of the tests were not originally even meant to measure creativity when they were developed (e.g. Big 5; ACL). Yet, especially the studies that were conducted in mid-20th century, these tests were used to measure theorised personality traits that were ought to indicate or predict creative tendencies. However, when these are all called "creativity tests", and the scientific studies are also reported by using the word "creativity" in them, they may all sound the same for the public even though the foci would not be on the whole phenomenon of human creativity.

It is not an easy task to communicate rather complex scientific results to the public who may not have required education to understand them correctly.

Very often these studies have been simplified in order to communicate with the big public. That has made some of the results vulnerable for different interpretations. Often the real findings are made to sound attractive (e.g. "Creativity Crisis")—or attractive in a way that they would answer for the current societal needs like for example, increasing the ability to cope in work life where one is asked to solve problems by thinking, or acting "creatively".

THIS IS WHEN I BUMPED INTO NEUROMYTHS IN REAL LIFE WHILE I WAS JUST WRITING ABOUT THEM:

> In autumn 2018, I was writing this study with my laptop at Moro Sky Bar in Tampere. In a full restaurant two gentlemen who were waiting for a hockey game to start approached, and asked if they can share a table with me—of course they can. After a little while they begun to speculate if I am a journalist writing down everything what they say, and asked what I am writing about. I briefly explained my thesis topic—mainly just the neuroscience aspect of it.
>
> The other gentleman was seemingly delighted, and explained that on that particular week he has been participating to a creativity workshop that was organised by his company. At the workshop they had learned how to stimulate the right hemisphere of the brain in order to come up with new wild ideas. However, his friend followed this enthusiasm with a little suspicion. He seemed to be more aware about a wide range of studies as we kept discussing about the topic, and especially about the issue that creative thinking requires both hemispheres and multiple areas in the brain—that the brain works as an unit.
>
> Yet, this kind of workshops are very common (and that other gentleman seemed to feel pure joy from participating in it, which was delightful to see). These workshops seem to be quite popular among the people who are especially working with tasks that, normally, requires more "rational", or linear and conventional thinking. Many of the workshops give a promise that through their training, a person can tap into the wild side of creativity—to their inner visionaries and innovators. Moreover, there is nothing wrong with encouraging people to use the spontenous side of them. However, how I see it—it was already there. It always has been there.

What has happened to uninhibited creative expression, and why it is not available and accessible for everyone?

What has happened to the idea of human creativity per se, if today we need workshops to know that the ability for spontaneous creative thinking lies in all of us?

> You see, with the modern creativity *business* I am extremely opinionated. From an individual point of view, it is only beneficial that training stimulates people's thinking and assist them to come up with more original, unconventional ideas, and that encourages them to practice e.g. divergent thinking, but taking the bigger picture into consideration there is an issue. The full creative capacity is not equally distributed.
>
> I think it is very human to standardise and categorise (all the) things that are new to us, or the things that are vague and we can not completely understand. These categorisations becomes rather obvious if, for instance, one looks at the popularity of the personality tests in today's business world. Many of these personality tests (and courses, and workshops) are organised by the company and the participants, the employees, are happy to find out which archetype they represent—and the company can harness the full capacity of each individual worker (i.e. increase productivity).
>
> However, most of these test are self-assessments and most of us tend to (unconsciously) respond to the questions of self-assessments in a socially desirable manner. We like to put ourselves in favourable light, in the light that meets the expectations of the society and its cultural values. (Runco 2007) We tick the boxes of admirable personality traits that are admired—and "being creative" appears to be one of them on this Zeitgeist. "Being creative" is accompanied with "being productive" even though these two do not match well—we are not superhumans.

We categorise a whole lot of things, but for how long we should wait with at least some standardisation system for coaching human creativity—until the phenomenon is fully cracked? Up to date that world is still like a Wild Wild West. Majority of the courses that are available seems to be influenced by Western biases on creativity: **Individuality and spontaneity**. Creativity is already a profitable educational business, but there are no real boundaries whether the training should be based on the 1950's studies, or on the findings from 21st century studies.

(I guess it would not make a great business if participants were simply told to have more time to let the mind wander or to incubate, for example. Those are not characteristics of a productive worker and they are often associated with procrastination—and procrastination is not cool at this era, is it?)

From the perspectives of human perception and development, it is very likely that all this information keeps passing on—our little people learn what they see. The probability is high that we spread misinterpreted information about "what is creativity" as well.

In order to harness everyone's creative capacity—or, in order to first correct misconceptions about creativity in the societal level, it may not be so harmless to make "rational thinkers" believe that their brain is somehow less creative than someone else's. If the participants are made to believe in dated knowledge about creativity it may have disastrous consequences on the next generation too.

Creativity myths spread effectively from adults to their offspring, and I believe that some of those ideas can harm creative self-confidence already at very young age. The responsibility about the correctness of provided data on creativity is with the educator, the ways how creativity is trained, and especially how we communicate about the phenomenon of creativity.

One long-lived myth about creativity is the role of dominant right hemisphere in the brain. Because the dominance of the right hemisphere predicts left-handedness—left-handedness must predict creativity too, right? You must have also heard about three different learning styles: VAK. That people learn through sight, sound or touch—or that we experience the world through five senses even though the researchers of today have pointed out that there may be up to 21 different senses. However, the question is that from *where* or *who* you have learned about these things?

(Question what to swallow)

Neuromyths mean loosely scientific-based misconceptions and incorrect assertions about how the brain and how it is involved in learning.

Neuromyths are "generated by a misunderstanding, a misreading, or a misquoting of facts scientifically established (by brain research) to make a case for use of brain research in education and other contexts" (DEKKER ET AL. 2012, P. 6). Researchers have been addressing the most persistent myths one by one that are involved with creativity and the brain—and they have found out that they are still very much alive in all societal levels.

In fact, in 2002 researchers made a study among primary and secondary teachers in United Kingdom and Netherlands, **who shared a common interest in neuroscience of learning**. 242 teachers were sent an online survey containing 32 statements about the brain and its influence on learning, 15 of them being neuromyths.

The results were worrying: On average 49 percent of the teachers believed especially on seven in 15 myth statements.

THE TOP THREE NEUROMYTHS WERE MOST PREVAILING AND MORE THAN 80% OF THE TEACHERS BELIEVED IN THEM:

- **"Individuals learn better when they receive information in their preferred learning style (e.g. auditory, visual, kinesthetic)";**
- **"Differences in hemispheric dominance (left brain, right brain) can help explain individual differences amongst learners"; and thirdly,**
- **"Short bouts of co-ordination exercises can improve integration of the left and right hemispheric brain function".**

To the statement that **"we only use 10% of our brain"** half of the teachers answered incorrectly. Among the general population in Brazil this idea is the most prevalent misconception.

Where do these misconceptions come from? For example in UK and in NL there **are popular, commercialised programs available that are organised for the teachers. These programs are ought to be brain-based but they lack scientific validation**. In fact, these (even very costly) programs spread a lot of falsely interpreted information into the classrooms around the world. In 2002, the researchers also found that "(…) teachers (who are interested in the neuroscience of learning but yet cannot distinguish neuromyths from real information) will be the most eager to implement brain-based ideas in educational practice and might promote the circulation of myths and spread their ideas to teachers who are less engaged and acknowledged with brain research" (DEKKER ET AL., IN CITED OECD, 2012).

According to the results, the teachers who had more general knowledge about the brain were more able to identify the neuromyths. But ***when people lack a general understanding of the brain and do not critically reflect on their readings, they may be more vulnerable to false information*** (DEKKER ET AL. 2012). In order to reduce and correct these misconceptions the study suggested that **the interdisciplinary communication should be enhanced, and establish a successful collaboration between neuroscience and education**.

Expanding the general awareness about these topics *does* count—it improves the quality of information that we share. That simply requires better ways how to *communicate*.

The mysteries of the human mind have fascinated people throughout the history.

It seems that the phenomenon of creativity falls into the same category with other things, that we did not completely understood at first but felt that we would need to.

Throughout the last century there has been questions that were puzzling the researchers, for instance: **What parts of the brain are associated with creative work? Are specific parts of the brain related to certain kinds of creativity?** The mid-20th century researchers were tackling these questions in their studies which, however, have led to a few erroneous interpretations about their findings. Their findings became especially bewildered by the public and in popular media. (RUNCO 2007)

For example the idea that *"creativity is located in the right hemisphere"*, is based on the simplified interpretations of the Split Brain Studies that were conducted in the late 1950's and during 1960's. Roger Sperry's study (1964) involved a sample of 29 epileptic patients, and in order to reduce patients' epileptic seizures he investigated the bridge (corpus callosum) between two hemispheres that allows the communication between hemispheres. The study reported observations about the patients' behavioural changes, after corpus callosum was cut in a surgery. Sperry got Nobel-awarded for explaining the purpose of this bridge, even though he received the actual award 20 years after publishing the results. (RUNCO 2007)

Around the same time when he got awarded, in the late 1970's or 1980's, was when Sperry's study—the study that was initially legit—and its evidence were handled in an overly simplified way. Around that time it was proposed that creativity per se, would be a result of hemispheric domination. There are a couple of problems with this simplification.

First of all, because Sperry's sample was so small, the findings can not be used for characterising people in general fashion. In addition, even Sperry's findings itself did not characterise *all* the 29 patients from his sample. The "evidence" then lead to misinterpretation that the most dominant hemisphere would define creative capabilities. Moreover, because the processes of the right-hemisphere supported the general idea that creativity is spontaneous, artistic behaviour, the idea of the right-brain-driven creative people became popular. (RUNCO 2007)

"Dominant hemisphere processes: Sequential, logical, analytical, and verbal, or proportional, are often assigned to the left hemisphere, and nondominant hemisphere processes to the right; simultaneous, holistic, visuospatial, appropositional, pattern-recognition, synthesis." (Runco 2007, p. 74).

"Left-right hemispheres are specialised and the possible hemispheric dominance contributing to creative thinking and behaviour have been studied with neuroimaging techniques, but "there is no one 'seat' of creativity in the brain, one responsible location or even hemisphere. Creativity may not draw from the entire brain but it certainly draws on many different brain structures and processes." (Runco 2007, in cited Dietrich p. 74).

However, if one's corpus callosum is intact, there is no way how to shut down either hemisphere, or cut down the communication between these hemispheres. The exercises that would activate either one won't do that. The "collaborating brain" is needed for every kind of creativity, from visual arts to scientific inventions. (RUNCO 2007, P. 73–75, 77)

Another similar idea to this "left-brain, right-brain" discourse is what claims that "left-handed people are more creative". It is as well, is a bit questionable idea. When the brain asymmetry and specialisation have been studied, handedness is sometimes used as an indication of the hemispheric dominance. "According to one study (Burke et al. 1989) even though left-handed people did slightly better on visual or figural tests of divergent thinking, the study suggested that this might be a so called creative coping skill because left-handed people often find themselves in environments that are made for right-handed people and this may contribute to their adaptability and creative thinking." (RUNCO 2007, P. 77) Runco continues and adds that the problem is, that most of the studies are based on reports which makes them "indirect and observational, at least in the sense that the focus is on handedness or behavioural tendencies and not actual brain structure nor function." (RUNCO 2007, P. 77).

(Question what to swallow)

Taking the role of the social environment into account, and how powerful influence it can have on an individual during one's upbringing, the idea that learning styles would improve one's process of learning becomes less mythical. However, (at least) in Finland this categorisation, or the results of the VAK test, are often associated with how the kid is going to turn out when they grow up—and do they possess creative tendencies (i.e. meaning artistic tendencies per se if are they visual learners; e.g. art bias, p. 102).

"VAK", or the idea of Visual, Auditor, or Kinesthetic learners is based on a valid study which proved that different parts of the brain are responsible in each of these three ways to process information. However, each of these ways are solely individual ***preferences*** how to learn new things—they are just preferences, or rather, the strongest networks in one's brain that have been strengthened over time. However, yet again, the brain works as a unit.

Individuals may have preferences for the modality through which they receive information, but these three separate structures that processes different types of information are "**highly interconnected** and there is **profound cross-modal activation** and transfer of information between sensory modalities". Furthermore, the research has shown that children do not process information more effectively when they are educated according to their preferred learning style. (DEKKER ET AL. 2012; RUNCO 2007)

> **Neuromyths can become harmful if they make someone to defeat their "destiny" and accept their shortcomings—that are not shortcomings in the end at all.**
>
> **It is not true that an old dog can not learn new tricks. The belief that "there are critical periods in childhood after which certain things can no longer be learned" is false.** Yet 33% of the teachers in UK and 52% in NL answered incorrectly to that question. A person *can* learn new skills and gain new knowledge in many levels and in different ways, including creative thinking for instance.

Creativity is a result of nature and nurture:
"(…) Thus biological factors contribute specifically to creative potential, and experience determines where within the range set by biological potentials the individual performs." (RUNCO 2007, P. 40)

According to Runco, the different older theories, tests, and studies on creativity are yet considered valid and trustworthy (RUNCO 2007, P. 73). Especially the most recent neurobiological studies on creativity—there is no need to make such poor conclusions about creativity anymore. Human creativity can be studied empirically better than ever before, even though creativity research is yet in its infancy (SAWYER 2011). The phenomenon has acquired a frame that it is studied in, and that frame has been established especially after the particular technological advancements that are meant for studying the human body were available.

We do not need to explain creativity as "a gift from above" because for "(…) **much of what has been learned from the so-called older studies nicely complements the newer findings** from the most recent genetic, MRI, and PET studies of creativity. (…) many of the MRI and PET studies **drew on the older studies to determine hypotheses or research targets.**" (RUNCO 2007, P. 73).

It may become even more difficult to distinguish what is "real" information and what is not—especially if one does not know what to look for.

However, the global online network is still *pretty* amazing place to seek any kind of information—but only if you have enough expertise, and you know what to look for.

THE LAST-MINUTE FINDING OF THE WORD "CREATIVITY"

If there is something that needs to be concluded about the thesis process and about the topic creativity, that would be: It should not be investigated alone. There are numerous studies and theories that are involved with the phenomenon, and thank goodness for a handful of authors; they have tackled this issue and gathered extensive compilations about the topic from various perspectives (e.g. Runco's "Creativity: Theories and Themes: Research, Development, and Practice").

It might tell something about the phenomenon that the first edition of the Runco's book that included 504 pages in 2007, which then has been revised and expanded twice in 2014 and again in 2019. In 2011 he published the *second* edition of "Encyclopedia of Creativity" that has staggering 1348 pages. The magnitude of the topic, and the pace how rapidly the research on creativity is developing is impressive.

In March 2019, when I had already thought that I had at least some kind of a hold on the topic and I had finished my years of exploring the topic, it soon became clear that was not the case at all. There are always new bits and pieces of information to be found.

With the help of Mark Runco's first compilation of the various theories and Keith Sawyers several books, I had data that I wanted to visualise. That data was mainly about the history of creativity, the different conceptions that were popular in each Zeitgeist. The visualisation is suppose to showcase the outline of the magnitude of this topic (and spare the reader from going through hundreds of pages about the history of creativity).

When I begun to place that data on the timeline in March, I soon noticed a spike that caught my attention. The majority of the theories and studies on creativity appeared to be conducted in mid-20th century. I obviously could not just ignore that.

Language resonates the sociocultural environment

It might not come as a surprise that the "older studies nicely complements the newer findings". That is because the frame for investigating and defining creativity is still quite the same as it was in 1950's to 1970's. Moreover, the mid-20th century seems to be where the research on human creativity seems to originate. What is more to that is that **the word "creativity" appears in the written texts for the first time in 1950's**.

QUESTION EVEN MORE WHAT TO SWALLOW

> Before of this study, I had already noticed somewhat fascinating developmental progress with the creativity theories, and how they have started to become more and more scientific as the technology and the knowledge about the human body has developed.
>
> However, the spike was new to me and it lead me to investigate if I could find who actually came up with the word "creativity". I did not find that information, but I found something else. Ironically, until these last metres of the research even I had not questioned *enough* what I had read, or explored from the source materials. I had absorbed everything.
>
> Yet, this is what I knew: Human mind is limited, and its ability to read nor generate things in a way that one's own personal bias would not be seasoning the content is difficult. The chance of errors is always lingering in the air. Every once in a while is good to stop and check what is on the table. That is what high-quality creative process is about too: The careful evaluation of data.

EMPIRICAL STUDY ON THE SEMANTIC SIMILARITIES OF "CREATIVE" AND "CREATIVITY"

"To empirically study word meaning change at large scale, we made use of the distributional hypothesis (Harris 1954) and combined the methodology put forward by Hengchen (2017) with the approach proposed by Hamilton et al (2017): indeed, due to the recent criticism of Hamilton's work (Dubossarsky et al 2017) and the somewhat different nature of our goals—we study the concept of creativity using words as a proxy, and not the words themselves—, comparing semantic clusters diachronically made more sense.

We retrieved the COHA (Davies 2002) corpus, lowercased and tokenised it, and trained word embeddings for every decade. Parameters were as follows: CBOW architecture, frequency threshold of 10, window size of 5. Following Kim et al (2014), models did not need to be aligned as the model for t+1 was initialised using the model for t."References: Dubossarsky, H., Weinshall, D. and Grossman, E., 2017. Outta control: Laws of semantic change and inherent biases in word representation models. In Proceedings of the 2017 conference on empirical methods in natural language processing (pp. 1136-1145); Hamilton, W., Leskovec, J., and Jurafsky, D. 2016. Diachronic word embeddings reveal statistical laws of semantic change. In Proceedings of the 54th Annual Meeting of the Association for Computational Linguistics (Volume 1: Long Papers), pages 1489–1501, Berlin, Germany, August. Association for Computational Linguistics.; Harris, Z. 1954. Distributional Structure. Word, 10(2-3):146–162, August.; Hengchen, S. 2017. When does it mean? Detecting semantic change in historical texts. Ph.D. thesis, Université libre de Bruxelles.; Kim, Y., Chiu, Y.I., Hanaki, K., Hegde, D. and Petrov, S., (2014). Temporal Analysis of Language through Neural Language Models. ACL 2014, p.61."

(Hengchen 2019)

At first, with a quick search I found one of my trusted source's article about this spike and the origins of the word "creativity". In a book review that Keith Sawyer wrote on his blog about Dr. Camilla Nelson's publication "Discourses of creativity" (2015), a few key points are addressed:

> "Dr. Camilla Nelson documents the history of the concept of creativity.
>
> Prior to the mid-19th century and the Darwinian revolution, the words "creative" and "creativity" were not used at all (see her Google Ngram on page 173), and "creation" was associated with the divine.
>
> Darwin showed that nature could be creative, without appealing to a divine creator. But still, for decades after Darwin, "creative power" in humans continued to be associated with a spiritual force (e.g., various forms of vitalism, such as Bergson's elan vital). In the same Ngram, you can see that the word "creativity" was not used at all until long after 1900, with a rapid growth in the 1950s forward. Bibliographic surveys indicate that there were as many studies of creativity published between 1950 and 1965 as there had been in the previous 200 years. Much of this work was funded by military and defence concerns.
>
> **Basically, she argues that today's concept of "creativity" was created by the Cold War, and the need in the United States to contrast democracy with totalitarianism. She argues that this is why creativity researchers define "creativity" in heavily Western and individualistic ways.**
>
> The language in this quotation should sound familiar, because it's the same argument we're hearing right now: Today's schools aren't preparing students for the 21st century creative economy. Have we really made no progress in education, in the 60 years between 1955 and 2015?"

This particular Google Ngram that Nelson mentions is placed on the timeline as well. However, my doubts about its reliability were legit, like Ph.D. Simon Hengchen confirmed as well: "[Google Ngram] is too biased to draw any reliable conclusion" (HENGCHEN 2019).

After a brief discussion we mapped out what I was looking for (i.e. I wanted to see if there are consistencies with the language and dominant creativity theories), Hengchen kindly retrieved more reliable data from the corpus—and the phenomenon of creativity surprised me yet again. I begun investigating the words and the word sets, and surely, Google Ngram sits nicely with the words that I got.

There is an overlap between Google Books and COHA corpuses—"as it is mainly books", like Hengchen points out. For this reason both of these datasets show that the word "creativity" begins to appear in literature only after 1950 (i.e. more frequently than under 10 times per decade). However, the word "creative" on the other hand has been described in various ways and the orientations of these words' popularity are depicted on the timeline. The word sets with "creative" have less rapid variation in them—why "creativity" seem so restless?

Hengchen reminds about the delay that each word may have; that is, that when using written material as a data source one should bear in mind that words have to be present in spoken language, and used enough before an author can pick them up, and to actually include the word in a book—also, writing a book and publishing it also takes time. (HENGCHEN 2019)

What I found interesting is that on the timeline the words that are describing "creativity" have took radical shifts and turns. Some of the words have just a ten year cycle—and these trends that describe creativity are changing rapidly until 1980's. After 1980's "creativity" becomes more stable. In other words, none of the words that were describing "creativity" in 1950's and 1960's survived, and today we have a complete new set of words to describe "creativity".

This got me thinking that since creativity seems to be socioculturally dependent; an adjusting phenomenon, that is ought to have an answer (and to make a change or have an impact) for the sociocultural environment's deepest needs—then is it possible that especially the early studies, that were conducted between 1950's and 1970's, have chased the explanations on creativity but have had completely conventional ways of defining the phenomenon from the start? Did the researchers know what they were looking for; originality and spontaneity of an individual, or something that is an universally shared add-on in the human embodiment?

Without a doubt creativity per se is a trendy topic yet today, and it is believed to have an impact on our societal and environmental structures and issues—and the research on creativity aims to give an explanation how the phenomenon works. However, what if the main frame and approaches on creativity today—the frame, that was originally developed during the Cold War, and that may have been affected by Western Bias and the Zeitgeist—are all based on the conventions of those decades? **Moreover, if some of the modern studies are using the same frame today, then how much of those biases from the mid-20th century are still influencing on them?** I am sure this issue has been acknowledged at least in some level by the researchers, even though the source materials that I had an access were not addressing this issue.

The semantic similarities suggest that grand old Aristoteles and Plato—and later, the romanticists and rationalists ideologies—may be influencing on the conceptions of creativity still today.

The division of the reason and emotion is highly dualistic. Throughout the history dualism has been rather popular in Western cultures. That can be found from the classic stories of the good and evil, for example. However, these two ideologies of Romanticism and Rationalism have entangled together after the centuries have passed—or have they? Have these ideologies just changed their form?

In the current Zeitgeist this division of the rationality and emotion seem to still exists. In addition, the popularity of science seems to have diminished compared to the artistic fields as the global communicational network has developed—but what would happen if science was made easily palatable? Furthermore, in today's world the Romanticist individuality and the dualistic way of thinking are flourishing everywhere in the Western world. The discourse on creativity is not the only polarised topic there is.

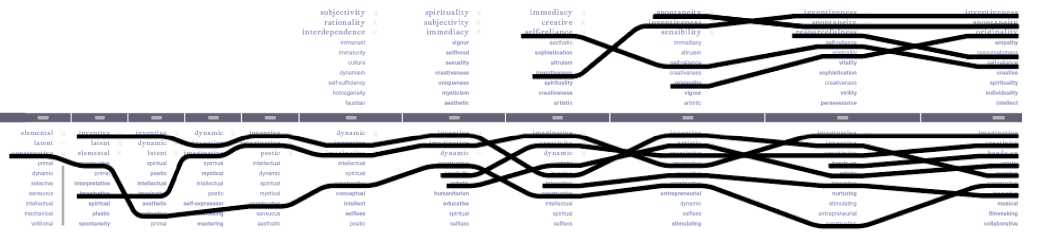
Should we improve the way how we communicate about ~~creativity~~ anything in order to find solutions that serve a greater good?

In the past, human-to-human communication was the only way to pass information—that is how people learned about new things. I am wondering that is it a coincidence, that mass media and the rapid increases of the studies in creativity occur around the same time? Is that why various (mis)conceptions about creativity are so wide-spread?

The directions that creativity research has took throughout the history, seems to resonate with different societal of different Zeitgeists.

The field of creativity has developed to its glory not only because of the technological or scientific advancements, but also according to each Zeitgeist's societal needs. Defining and explaining creativity has not only been about the human need to categorise things that are unknown and vague, but it has been also about the societal need to explain something that pushes the societal development further. In today's world there seem to be a lot of issues to tackle, and a lot of creative minds that could find solutions. However, what comes to today's creativity research, then why their findings are not as popular as their older counterparts during 1950's for example? Are the most recent studies from the field of creativity resonating enough with the current Zeitgeist? At least their findings would be, since one of the issues in the current sociocultural environment is stress, and mental and physical wellbeing.

Why the findings from the field of neuroscience have not gone viral? Has creativity got lost in translation?



An idea about insight-centricism

I find it a bit funny that the more you learn about the beautifully flawed brain, and how it processes and selects particular data, the more you begun to question any piece of an information that you are receiving. One thing that I have become especially skeptical about is that, compared to older theories exactly how much more reliable data the most recent studies in creativity are offering today, if the research targets are still drawn from the older studies (e.g. from the 1950's)? **Is it possible that contemporary creativity research is blindfolded by its own historical development?** These questions would require much much more investigation before any reliable conclusions can be made. However, this gave me even bigger reason to hypothesise a future scenario for human creativity, and paint the picture of utopia of creativity-friendly environment.

WHAT WOULD HAPPEN IN THE WORLD OF INSIGHT-CENTRICISM?

> **I am fascinated theorising that how creativity would be perceived, if the frame for evaluating "high-creativity" and creative success were expanded in a way that individual creativity would be solely:**
>
> - investigated by the level of social impact and value one's creation may have, and
> - from investigating the routes that one's creation took, before it developed into something socially significant.

> How **a frame that would only focus on the level of quality of insight**—i.e. how long-term or socially significant that insight was—would impact on people's attitudes about their own potential and could it? Could this type of thinking bring foci back to common goals to solve issues that touches the global community?

What if a common consensus was about the society appreciating an innovator, who was able to generate something that fulfilled only the third category of creativity: Socially valuable, useful and appropriate creative solution. It is obvious that any science requires a set of rules that it is studied in, and creativity research requires a frame like that too, but how

about letting the categories of "original" and "novel" be only for scientific purposes? I consider that this kind of a new frame, a set of "rules", given to media, or any facet that is informing about creativity, would change the widely accepted idea that creativity is mainly about inventing "something different". Innovation is not only a privilege of a few, and the emphasis should be on what the several studies have shown:

Creativity requires conscious deliberation and social judgement as much as it is about generating spontaneous insights.

It would be not about the journey, but the destination to be able generate more socio-environmentally valuable and long-lasting solutions—a greater good. Creating this "greater good" would not be about the individual per se, and more about the collective creativity that has enormous potential to make an impact. The new frame of creative insights would focus on improving one's own perception as a potential creator, who is part of a larger pool of other potential creators.

If creativity research took this direction as well, and announced their findings from this point of view, the only thing that popular media would then have to provide for the public was that. What kind of influence that would have in societal level? Could that encourage more people to turn their creative potential into ever-improvable creative capacity? How to make this capacity more accessible for everyone despite of the issue whether they had took any courses nor read any books about creativity? What if everyone just used their heads more?

What if everyone were allowed to be just how they are?

An individual's creative thinking abilities can be enhanced, as the chapters that focused on cognition and the databases explained, but how much more powerful it would be, if individual great minds were brought together and the solution was collectively seasoned with all sorts of unique databases?

It would allow an individual be just how they are; highly sensitive or less sensitive, or an expert or an amateur. However, when these different groups of *authentic* people were brought together there would be cognitive–emotional and deliberate–spontaneous balance—four routes, four unique visions for generating the next big thing.

The long roots of individuality is in contradiction with the globally connected world

The evolution with the phenomenon of creativity seems to have a similar progression than any other science. Different conceptions on creativity seems to repeat a pattern like trends usually do. It is ever-repeating progression that can be seen in any field of study. With creativity, however, it seems to have aimed to have a grip on societal issues and fix the current problems in the society—moreover, and all known creative manifestations have tried to satisfy the needs of particular Zeitgeist.

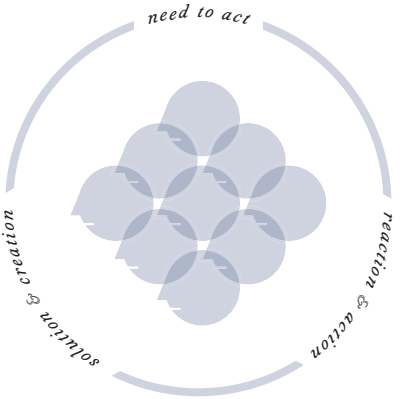
However, comparing different Zeitgeists is problematic.

Runco (2007) states that comparing specific historical eras in different cultures is problematic because they are not entirely incomparable: "Changes and differences can be easily identified but these suggest that comparisons are not reasonable. **It is also unfair to compare people working in different eras**. (…) Consider this: Sigmund Freud publish an impressive 330 books and articles, but what he or another luminary have done with electronic dictation or a word processor?" (RUNCO 2007, P. 260).

For this reason, the timeline should not be used for finding connections but instead critically viewing and spotting the differences between then and now. Also, on the timeline, each ten 20th century words that describes what or who was "creative" may have had different meanings in different decades. They should not be compared to each other as single words but as whole packages of **different tones of voice**. These word packages are clearly different from each other, and ***the distinct tone of voice*** at each decade reveals something about the general idea about creativity at that time or that what kind of a ***social status*** "creative" might have had. The written language reveals whether creativity was seen a positively or negatively charged trait.

The concept of creativity has not changed significantly within the past 50 to 70 years but the sociocultural environment has.

Should "creativity" be updated?



The most popular social movements have changed throughout the times, and these ideologies per se, have arouse from the current social settings. What depicts these changes quite well is the language that we use in daily life. Language resonates from the culture we live in—it depicts the values and popular trends, for example. Human-to-human communication and (mass) information technologies have a massive influence on the changes that moulds the sociocultural environment.

These two rather opposing ideologies of rationalists and romanticists that might be influecing on the people's attitudes in the modern society and yet today, becomes even more apparent when looking at popular media and how the stories about creativity are told to a wider audience.

Yet today human creativity is ought to respond to our societal needs.

Current sociocultural environment's problems does not differ much from issues that people had to face in the history. Still today creativity seems to be affected by major societal events and situations but compared to previous times, e.g. global warming and the state of our planet have become the new problems of our era. Attitudes, expectations, and assumptions about *creative things* and *creative people* have remained quite the same since mid-20th century but, actually, the general social attitudes, expectations and assumptions are quite the opposite in the 21st century.

Between 1950 and 1965 there was more studies of creativity conducted and published than in the previous 200 years. Is it surprising that babies who were born during this era—which is *a lot of people*. Are this large number of people those, who still holds the ideologies and attitudes

from the era they were brought up in, including the idea about creativity? At the moment the current society needs to address the issues of ageing population, the problematic issues with overpopulation, and the challenge that what actions are required if we like to call the Earth as our home in the future too. However, baby boomers are not the only ones to blame.

Scientists have warned us about the state of our planet for quite some time and it seems that only just very recently people have woken up. Now, *now* we are acting and we are acting fast. People have turned to their leaders for demanding actions. The evidence now exists that something needs to be done but no one exactly knows that what is it exactly that would need to be done. So, we think that creating a bunch of bubblegum solutions will save the planet, even though they may do the exact opposite and may need to be corrected in the nearby future, *again*. Is this the right way to approach major sociocultural and environmental issues?

Everytime when we have addressed some major global challenge we have generated a new innovation that solves the problem—but not for long. All creative solutions have an expiration date and only ideal solutions exist.

What if we would take an extra minute (i.e. social incubation), gather more great minds together and begun to generate a long-term, deliberate and carefully evaluated high-quality solutions? Because, in fact, **there is no such thing that would be a *perfect* solution** like Asta Raami points out (RAAMI 2016). All solutions are flawed and will require fixing in some point: It is an endless cycle of the need to act, an action and the solution.

This argument becomes evident when looking back to the history: Every solution that the human mind has generated has evolved after the sociocultural demands have changed. Sometimes the creative solutions per se have ignited a new challenge that needs to be addressed with a new solution. Also, every piece of information that the human mind can generate is always limited—especially if has been generated by one person, an individual.

Even though the limelight seems to be directed mainly at the politicians of today and maybe not so much on the exceptional geniuses—still, also politicians are just *the minority of population*. Nevertheless the ones, who are making decisions considering the whole population, would be turning to "creatives" (and lobbers) in order to seek advice and ask for help, it may be that we need to do ***something different*** this time.

What if all the great minds were working as one unit?

Without a doubt creativity is yet ought to respond to societal and environmental needs but solving current global issues should not lie only on the shoulders of minority of the people. In that way the quality of solutions will not improve. We have our current societal needs that would require fast response and rapid actions (RAAMI 2016; SAWYER XX; SEPPÄLÄ XX) (IBID.), and some people are already aware of this. Why wouldn't we turn the gaze on *the majority of people* this time, in order to make solutions that could have an improved longevity what comes to their *appropriateness*?

I consider this almost like a responsibility: Every person in this world has the creative potential which, through encouragement and education, can be enhanced into a global creative capacity. For example, if you have a body that functions or eyes that can see and you do not question to use them, then why to question whether or not to use the in-built feature of human creativity? Why *human* creativity—and the idea that a minor group of people are responsible for solving out every single puzzle—is so elitist?

We already have all the technological tools that are required for mass communication and exhanging ideas and solutions in a "global village" (Marshall McLuhan 1967). However, shifting people's perception about their own creative potential, and the enhanceable ability to create, may require a lot more actions than Guilford thought in 1975.

At first it would require a massive universal change with the attitudes and a common goal to correct old misconceptions about creativity: e.g. changing people's false ideas that generating innovations—or creativity per se—would belong only to a creative elite into an idea, that there is no such thing like some exceptional group of mystical Mad Geniuses. That we all have the creative potential (and responsibility) to participate in finding ideal solutions.

When critically investigating the timeline of creativity, and famous inventions, there is a lot to learn. What has brought us, for instance, joy or entertainment in our daily lives in the past, or made the social and economical growth possible, are the same issues that we have to address today. This is the problem with "**mass produced creativity**". Without a clear goal for human creativity, or non-standardised nor regulated use for the global creations, it can lead to short-sighted, problematic inventions.

Think about the steam machine itself that has been considered an invention that ignited the Industrial Revolution. This does not mean that Watt, or any other inventor per se, would have intentionally meant to do harm—it is just that the solution has been often evaluated by small group of people, and no one investigated the long-term effects enough. It is easy to get intoxicated from the feeling of inventing and from new great inventions but, when the solution is out there, there is not much that can be done anymore—and *then* the solution can touch the lives of the whole population even if it was originally meant for only a few people.

Who *was* ought to be creative in the past, and who is creative today?

"Even the studies of individual creators, when researchers focus on the social and cultural origins of their ideas, have revealed a high degree of collaboration behind their idea (SAWYER & DEZUTTER, IN CITED CSIKSZENTMIHALYI; FARRELL; JOHN-STEINER, 2009). What makes us still think that creativity belongs only for a few?

> If creativity is expected respond to global societal and environmental needs, then could it be considered that a wider range of people may need more encouragement to use their intrinsic creative powers? Not only to create more and more solutions—or, the problematic "bubblegum solutions"—but also to pay better attention on the quality of the solution.
>
> In order to do so, it be reasonable to double-check how we communicate about creativity with the new creative elite—with our youngsters, like the inventor of System 001 for example. Should the common concept on creativity be updated after all these years—now, when 60 to 70 years have passed since the golden years of creativity research?

Our communication, and the language that we use when talking about creativity, speaks itself.

Human-to-human communication reveals a lot about particular sociocultural environment, its attitudes, and the spirit of the people.

In the end, it is the ***whole*** sociocultural environment that defines who is ought to be creative—it is not only the scientists, media, or creativity coaches. "Creativity" seems to have extended in to various dimensions in order to response each times' societal needs or issues. Individuals who have been considered "highly creative" have been able to response to these needs, and it may be the reason why so many of them have their own chapters included to our history books. However "exceptional creativity" is not the only explanation for their fame.

> The other thing that becomes apparent on the timeline, is how noticeably different concepts on creativity have changed through time. Maybe linguistics studies could follow the direction and progress that where exactly we are going with the next concept of creativity in nearby future? (i.e. 2020 corpus)

The social hierarchy, nor individual's social status within different societies, may not be as apparent anymore as it used to be (e.g. artist vs scientist) but it does not mean that social categories would be completely gone. The idea of a small impactful (creative) leaders, should be long gone by now too, but it isn't. The Information Age that has been on-going now for over 40 years has enabled us to use multiple tools to communicate with each other, across the country borders, on different timezones—**the information technology has enabled a voice and a chance for an impact for everyone**.

BE A RADICAL BUT DON'T BE A DAMN FOOL: OFFERING THE ALTERNATIVE SOLUTIONS ALONGSIDE RADICALISM

> There is a constant feed of **mini-activism**, these mini-controversial acts about the big current societal issues e.g. in social media, that arises from an individual per se (i.e. emotional brain; values, attitude, motivation and so forth).
>
> Topics can vary from toxic masculinity, feminism to saving the animals and the planet; from milk and food to farming, GMO... anything that *feels* important for the person. You know the drill. **However, there is a difference why all of the modern-day radicals do not end up in history books: *They do not act*.**
>
> It is rather rare to see that someone would actually share their creative insights alongside the rant. Taking a stand is easy, liking and sharing is easy, but providing actual solutions or fixes to issues that we believe in, is not. There is a risk of losing your face, the delicate social status of oneself, and with providing alternative solutions one does put themselves easy targets for criticism.

> What are we afraid of really? These solutions may not be high-quality or carefully evaluated at first, but I again argue that any idea would be better than no-idea. The tiniest half-baked idea can indeed become something bigger, and for that reason there seems to be a massive potential what comes to the paradigm shift of creativity, in open human expression and open communication.
>
> Today the limit to express whatever is happening in an individual mind is lower, but conventional social statuses may have to fade more and more before that (brain-generated) content develops further. I believe that also mini-activists might need a bit of encouragement that would make them to acknowledge that it is also them who can generate (at least self-evaluated) solutions. Be a radical but don't be a damn fool and act: Create alternatives.

The misconceptions that e.g. Mad Geniuses worked alone or that creativity belongs only to a particular group of people still exists among the public.

The Western consensus on creativity has formed (especially) within past 200 years, but it got stuck in the Romantic era.

Some investigations on creativity have focused on an individuals' personalities per se, and they have attempted to identify the key characteristics of creative individuals. Even though many of these studies were conducted decades ago the findings are still considered to hold true (RUNCO 2007, P. 281). Also from these theories the researchers have developed e.g. a variety of tests that aim to measure or predict creativity. The personality approach seems new, only 60 to 70 years old. These particular characteristics that were considered to indicate creativity, were often possessed by eminently creative people from time long past. The sociocultural environment has changed enormously since then.

Most of the findings from personality studies, that originate especially to the 1960's, have some advantages and disadvantages. One major disadvantage for their reliability has been the foci on homogenous sample groups; they have focused on the minority of the population, on people who were *professionally* talented or educated people, and who were recognised by their peers or by the public: e.g. architects, writers, mathematicians, and space specialists (RUNCO 2007, P. 280–281).

Personality tests have been especially focusing on artists—one of the first records about artistic creativity date back to Ancient Greece—and even though Runco (2007) states: "Art may represent the most unambiguously creative domain of all." (RUNCO 2007, P. 287), it is fair to point out that yet again, these samples do not represent the population at large.

Personality theory after another has been buried by modern creativity researchers as being too narrow or paradoxical, and the recent studies have focused more on insightful thinking for which we are *all* capable of, and on the creative production. These studies explain the capacity of individual creativity. The contemporary studies seem more neutral in a sense, that they focus on the universal characteristics of human creativity, rather than investigating the characteristics that may distinguish particular individuals from rest of the crowd—even though, that is exactly how most of the findings have been researched; from investigating anomalies in the brain (e.g. the case of Phineas Gage). That could be seen as positive continuity for the creativity research—even though, yet again, its roots are in the 1950's–1970's studies.

Eureka! The stories that we know from the history books, popular media or from everyday language are romanticising creator's anomalies.

Many of the examples of creative personalities oppose with one another which adds even more confusion to the creativity complex. Compared to the heroic stories of pioneering Mad Geniuses from different eras, the modern cognitive neuroscience studies in creativity have not yet established such a popularity.

The mystery of creative personalities may fascinate the public more than a realisation that personal effort and creativity-friendly environment can have bigger influence for one's success.

It seems that the current media tends to forget these factors from the movie plots, headlines and articles as well. The creative idols from the past are still depicted just as mysterious and magical characters as they have been for last 200 years. Media repeats information that is familiar to us which can only enforce the things what we already "knew" about creativity.

THREE FAMOUS STORIES ABOUT THE EMINENT CREATORS AND HOW THEIR LIFE STORIES ARE USUALLY TOLD

> I am curious to know what would be the results, if there was an survey conducted on people asking to describe eminent creators by only showing an image of the creator's face?
>
> For example, if showing Einstein's picture, would people associate him to the Theory of Relativity (i.e. the high-quality solution), a person with exceptional intelligence and high IQ (i.e. desribing the person's talent or creative process) or someone who was rebellious (i.e. describing the person's personality)? And if it was possible to include Einstein himself to these studies, how would he feel about these answers?
>
> Would Sir Isaac Newton really want to be remembered as a guy who got hit by a falling apple or an educated mathematician, physicist, astronomer, theologian? A scientist who worked hard to crack up the riddle of gravity?
>
> Yes, it may be that the apple gave the final push for him to have his Aha!-moment, but what he had chose to do before this observation, was to gain a lot of knowledge from the fields that benefitted his insight to develop further. From that expertise "the apple guy" eventually got known for Newtonian mechanics, laws of motion and universal gravitation, which led to prove Kepler's laws of planetary motion, account for tides, the precession of the equinoxes and other phenomenon, eradicating doubt about the Solar System's heliocentricity.

Considering the major impact that his work must have had to the 17th century society (and continues to have today), from him, as an individual who was opposing something so profound (i.e. the other people's view of the world), ***it must have took a lot of courage***. Would Newton's peers at that time nominated him as popular or controversial (i.e. having a high creative potential)? Or an average, rejected, or neglected man (i.e. having low creative potential)? And did social acceptance matter to him all that much anyways?

How the story goes is that actually Newton may have been contrarian by nature (but maybe not intentionally, p. 181). He was well known to have the most complex and difficult personality even though he described the opposite, a more serene version of himself while laying on his deathbed.

"I do not know what I may appear to the world; but to myself I seem to have been only like a boy, playing on the sea-shore, and diverting myself, in now and then finding a smoother pebble or a prettier shell than ordinary, whilst the great ocean of truth lay all undiscovered before me." — Sir Isaac Newton (HTTPS://ROYALSOCIETYPUBLISHING.ORG/DOI/ABS/10.1098/RSNR.1995.0001)

We also have another well-known creative rebel. An educated, highly intelligent and extraordinary thinker already at young age. A loner who solved out the mysteries of the Universe and who had high-level expertise in his field of study—Einstein. He competed against time with his Theory of Relativity because there was another guy who had got familiarised himself with Einstein's studies and tried to solve out the exact same riddle. The other scientist happened to slightly better in mathematics than Einstein. Einstein, who was not magnificent in maths, had other people to help him out with his shortcomings. In the end of the story, Einstein won the run and got his glory. (DOCUMENTARY: INSIDE EINSTEIN'S MIND, 2015)

INSIDE EINSTEIN'S HEAD

In early EEG testings a few Mad Geniuses have been tested—Einstein being one of them. Ph.D. David Groppe (2017) has discovered some of the findings that what was going on inside Einstein's brain that time, and he quotes:

"The familiar blocking of the occipital alpha rhythm when the eyes are opened also occurs when the eyes are opened in a totally darkened room, 'trying to see.' (Adrian and Matthews, 1934.) It is the attention rather than the visual stimulus as such that causes the reaction. This is shown also in problem solving. Simple arithmetical operations cause no appreciable effect, but when a difficulty is encountered which requires special concentration, the alpha waves are blocked, to reappear promptly when the problem is solved.

For example, Einstein was found to show a fairly continuous alpha rhythm while carrying out rather intricate mathematical operations, which, however, were fairly automatic for him. **Suddenly his alpha waves dropped out and he appeared restless. When asked if there was anything wrong, he replied that he had found a mistake in the calculations he had made the day before.** He asked to telephone Princeton immediately. [pgs. 189-190]" (Groppe 2017).

Then we have quite the opposite genius: A sensitive artist who was not seeking glory as much as Einstein and who did not make a big fuss about himself—not purposefully at least. Van Gogh was a bit of a loner as well. A man who died tragically and suffered from serious mental illnesses while he was alive.

It is said that ***he saw the world differently***, in an original way. Without formal education in arts, he tried to translate what he saw on canvas. That was his main goal: To make people to see how he saw the world and how it felt like to be alive and connected to nature.

He died before any of his art pieces were sold and never got a proper recognition from his work during his lifetime. Like Newton, he was not very popular among other people either, because of his eccentric nature that was not very well understood in 19th century society. (MOVIE: LOVING VINCENT, 2017; MOVIE: AT ETERNITY'S GATE, 2018)

There is a whole bunch of these popular stories about the inspiring people who became creative heroes at their time or after they passed away.

These stories are often focusing on the distinctive characteristics of each person, and how they differed from rest of the society mentally, physiologically or by their appearance. Or controversial behaviour.

The information, that about how much education, hard work, or internal drive was contributing to their accomplishments is often missing or overlooked in popular media. However, if one is investigating these people from the sociocultural or behavioural perspectives they may find some commonalities in eminent artists or scientists. None of these three eminent creative people were working completely alone. Also, the sociocultural environment accepted their ideas—except Van Gogh's.

> "(…) a wide range of empirical studies has revealed that significant creations are almost always the result of complex collaborations." (SAWYER & DEZUTTER 2009, P. 81)

Also, at least with Newton and Einstein, the timing of the creation was suitable and fitted in the society. Van Gogh was supported financially by his brother, Einstein gained assistance from others for his shortcomings in math, and Newton must have had *at least one person* who believed in him and in order to oppose the majority of people and their world view (i.e. the geocentric, ptolemaic world view).

These stories are just glimpses of the eminent creative people.

The driving force that kept them going in order to reach the finish line is not usually depicted in these stories—that is, their own intentions and goals. Their emotional brain and drive. Also, what is often missing from the records is whether or not they were aware of the magnitude of their creations at the time. Why it is not so well informed, or studied, what occurred in their emotional brains? In which extent their behaviour or actions were driven by the unconscious processes?

Most certainly some of them must have had a hunch about the impact they were about to make—which kept them going. But what if we studied them from outside our own limited perception; e.g. what if Newton meant no harm by being a little difficult nor by coming up with theories that would change completely how people saw the world around them?

An internal drive, persistence, or the unexplainable need to create, are another factors that connects the stories of eminent creators. Some of them worked relentlessly producing vast amount of ideas or works of art before hitting the bullseye (e.g. Picasso and cubism), and evidently some of their thinking processes benefited from the vastness of gathered information, expertise and skills.

Persistence is associated with intrinsic motivation, and confidence with self-promotion. (Runco 2007, p. 315; 302)

When eminent creators have been studied and interviewed, perseverance and persistence stands out again and again. This may be because the successful insights and high-level accomplishments; big C's, often require a large investment of time from an individual. (RUNCO 2007)

Everyday insights—little c's or the mini-insights—occur much quicker.

In fact, they can come to us so fast that we are unable to even recognise them being "creative". *e.g. Bristol et al. "Neurds"; Sawyer "Associative thinking"* (Dietrich 2004; Hälinen 2016; Runco 2007) (ibid.)

We are using our creative abilities *every single day* but we do not give enough credit for ourselves—nor for our minds for generating them—even if they could ultimately play a crucial role in generating Big C's.

Depending on one's own intentions, and especially if the person aims for big C's, there is a lot to learn from the ***habits*** of heroic geniuses. For learning about these habits is when historiometric perspective becomes handy—**as long as an individual does not change their personality to conform someone else's**.

Accepting one another just as a complex human beings as they may be, can be the key for practicing authentic creativity and establishing steady individual creative self-confidence.

What the stories of eminent creators *should* teach us more often, is that with what things we should not conform. They should also teach us when to adjust the sociocultural environment, in order to be heard (or to gain a status of a "creative person", if that is what the person aims for)—creativity is a social act.

Most likely the core characteristics of the well-known Mad Geniuses' personalities were neither so straightforward. These characteristics that are acclaimed to predict or indicate creativity and that some theories describe, are quite simplified if the complexity of any living organism taken into consideration. If an individual tries force oneself to fit in these frames they may lose the ability to tap into to authentic creativity, and/or in the creative process, lose the ability to recognise the signals that the body is sending. When person loses that ability it may cause a block, or in other words: It becomes an internal constrain. You are working against what your heart wants (i.e. the unconscious processes).

It may be that if a person compares themselves too much on other creator's characteristics or their ways of working—the person lacks not only courage, or the ability to manifest one's own creative abilities that naturally arises from individually built cognitive and emotional databases, but it can also cause other issues as well:

> "Paradoxical personalities or antimonies (Barron & Harrington 1981; Csikszentmihalyi 1996) may cause some problems to people having such personal paradoxes. **They can cause cognitive dissonance—how we might change the way we think to avoid certain kinds of intrapersonal conflicts.** (…) The constellation of characteristics and traits that describes creative people is an odd mix (…) but **the tolerance that characterises creative people may allow them to accept their own paradoxical personalities.** (…) **The ability to resolve antimonies or to accommodate apparently opposite of conflicting traits in one's self concept, and finally, a firm sense of self as 'creative'** (Barron & Harrington 1981, p. 453)." (RUNCO 2007, P. 298)

Runco (2007) notes that just like the phenomenon of creativity, (creative) personality is also a complex and ***there is no one key trait for creativity***. What captures the complexity though is combinations and interactions among traits, attitudes, abilities, and values, and all creative personalities vary according to person's domain and even from person to person (RUNCO 2007, P. 315). **Creativity is always biased by one's vocation and sociocultural environment, by one's own or others' expectations, and one's intentional or subconscious need to adapt to the scene**. One should not try to fit in or conform the beliefs, nor urban legends of creative personalities—instead, for example self-assessing one's own Trait x Scene behaviour may be much more fruitful for finding authentic creativity.

> "There is no such thing as a creative personality (Taggar, 2002). (…) Research suggests that our habits of perception and thinking drive creativity more than some mysterious genetic trait—and habits are things we can do something about." (OWENS 2011, P. 26)

However, what may have lowered the creative self-confidence significantly is the myth of a Mad Genius. That myth has formed especially in Western cultures during the Romantic era and is still fed by the media of today. ***The myth of Mad Genius*** explains the stereotypical ideas about *who is creative*. Mad Geniuses were considered a tiny elite who were making the world better or who had an impact. They were eccentric heroes, admired group of people with extraordinary knowledge and skills—all thriving from the inner spirit of an individual. Very often mental illnesses were linked to these innovators and people believed, and still believe, that there was *something different* about their personality and the creative process that made their ideas becoming innovations. (BODEN 2013; SAWYER 2006) (IBID.)

These historical creative geniuses are excellent examples to make a point that it is it not a coincidence that all of them are from specific eras—it should not be a surpise that "**the average person still holds to romanticist conceptions of creativity**" (Sawyer 2006, p. 18)

At the end of the day human creativity is nothing else but data. An organic synthesis and an interaction of the internal and external data. However, that data has a memory, too. The phenomenon of human creativity has its history, and that itself has created a few constraints on *who is ought to be creative*.

SELF-REALISATIONS AND CREATIVE SELF-CONFIDENCE

> Given that perseveration to old information is anathema to insightful thinking, it is evident that a fully operational prefrontal cortex enables cognition that is necessary for generating insights (Dietrich 2004). What comes to establishing steady creative self-confidence, it requires an ability to critically dig in deep, and find out what kind of "old information" may affect on how one perceives themselves, how one perceives themselves as creative individuals.
>
> **The metacognitive process in creative self-confidence aims to assist with gaining these personal insights that could solve one's puzzling questions about themselves as creators. It aims to assist one to find their own anathema: *Why* I do not consider myself creative (or creative enough)?**

The stable elements and developing variables with creative self-confidence

"Personality can be defined as 'that pattern of characteristic thoughts, feelings, and behaviours, that distinguishes one person from another and that persists over time and situations'." (RUNCO 2007, IN CITED PHARES, P. 280) Personality represents fairly stable, consistent and continuous element in human nature because it has formed within lengthy time—within one's lifespan. (RUNCO 2007)

Runco quotes Phares (1986, p. 6): "The critical feature is the unique way in which each person combines stable traits", which may explain why all eminently creative people are not showing exactly the same traits. **Personality is yet another variable in the phenomenon of human creativity and it forms over life time**: We age, our experiences and situations change—and our behaviour adapts into these changes. Like the brain develops during maturation, personality shows similar development as well.

There are things that an individual can have a high impact on (e.g. habits and mood), things that one cannot impact at all (i.e. automatic unconscious processes), and things that have at least a little impact (i.e. reshaping ones own personality and an impact on the sociocultural environment). We are just organisms that are interacting with other organisms, and it means that we adapt. However, what we are as well, is that we are not simple.

> "I have devoted 30 years of research to how creative people live and work, to make more understandable the mysterious process by which they come up with new ideas and new things. If I had to express in one word what makes their personalities different from others, it's complexity. They show tendencies of thought and action that in most people are segregated. They contain contradictory extremes; instead of being an individual, each of them is a multitude." (CSIKSZENTMIHALYI 1996)

However, I think it is fair to point out that non-creative people have not studied as much as the eminent creators. That is a new field of study, and I believe that each one of us' personality shows a multitude of personalities. Yet, personality research has formed different frameworks for evaluating that which traits may predict creativity.

Runco (2007) uses a division of traits that are either indicative to creativity (e.g. nonconformists) or contraindicative creative tendencies (e.g. conformists). This type of division has been based on the knowledge of eminent creators and that is one reason why, for instance, a lot of famous creators were known for their rebellious behaviour. Not all indicative characteristics are socially admired or favoured.

When the personality tests were in, and their categorisations were established (e.g. ACL test) they included a lot of traits that were not socially acceptable or admired (e.g. neuroticism in the Big 5 test). However, yet today the stereotype of a creative person is positive—almost like an idol.

It does not matter if the person has socially unacceptable traits, no. In today's world, it appears that creative idols are romanticed. Moreover, if there is anything eccentric or extra special in that person, the public assumes that that "something" explains the success of the eminent creator.

Furthermore, the social surrounding may be also encouraging specific traits to come out. The person who is considered creative by one's social setting may conform their personality to meet the expectations of sociocultural environment either intentionally or subconsciously. The creative individual begins to behave like they are expected to. (RUNCO 2007)

This does not mean that creative people who are a bit weird, would be all phonies because, for example, the autonomous or unexceptionally original person who has gained peer support and has been allowed to freely express that "weird originality" in one's previous life without the lack of social acceptance, may be completely genuine and just more courageous to express that trait in public.

Controversial individuals often choose that creativity-friendly environment where they can fit in, and demonstrate their originality without the social limitations.

It may be that the eminent creators are simply the driven people who are aware of what their inner world is telling them: "(…) the creative person values creativity and intentionally invests time and effort in creativity. They *choose* to fulfill their creative potentials and choose unconventional and original ideas and careers." (RUNCO 2007, P. 83–84; P. 314)

What these messages should send to a wider audience is that the example image of a creative person is not so simple. Some eminent creators may have intentionally chose to be a bit funny or weird, and some others did not. That behaviour has been dependent on their own intentions and/or inner worlds.

Considering the impact that a person might want to have on one's surroundings, it should not happen with the cost of "socially-defined

high creative potential". Even though personality theories have defined personality traits that may be indicative in creativity, and some other traits that are not, there is not just one golden rule for what kind of a person the "creative person" should be—it is completely defined by one's social setting and domain.

It may be that the only golden rule is to conform in a way, that one's personality would not intentionally do harm for others—it is the thumb rule for creativity, it is common sense, and it is a rule that one may already follow, if they follow other social rules as well. **Creative success depends completely on other people, not the creator itself**.

Before investigating the multitude of eminently creative people's traits in-depth, one may want to ask themselves what are their intentions and personal goals. Is one seeking the personal success or success for one's creation? Does the person value more the high social status as a recognised creative who is maybe known for their controversial behaviour and diverse ideas with the risk that they may not become accepted by the public?

Or—is it far more important to gain social acceptance that grows the likelihood that their ideas will be heard and have high sociocultural appropriateness? **And what if there was a grey area where no one would have to choose "either or" and yet they would be creative just like any other? What if creativity was not idolised by someone's personal tendencies but solely by one's creation?**

Practicing authentic creativity would be like a win-win situation where the creator could be comfortably anything—just like they are, and that would not affect on their socially defined creative-status in any way.

I consider that authentic creativity requires staying true to oneself, and honouring one's own values and attitudes, in order to reach the goal whatever the goal may be. I claim that staying true to oneself may bring resilience to an individual: It improves the tolerance that allows one to accept their own (paradoxical) personalities and lessens the possibility for cognitive dissonance. It allows you to have many identities, and as trait x scene explained—they may all be genuine features of just one person. Personality has more than two dimensions, and personality should not define who is considered creative and who is not. Also, if considering that someone would always have to *intentionally* shift their personality depending on the social situation, I believe that can be exhausting in the long run. If anything, then this is what I have learned after being almost 18 years in the field of design and from working with the trained and professionally talented creatives.

ACTIONS SPEAK LOUDER THAN WORDS: PRACTICING AUTHENTIC CREATIVITY AND GAINING POPULARITY AMONG PEERS

> No, practicing authentic creativity does not necessarily mean that an individual may have a high impact on social level nor success nor popularity. The success depends completely whether one's values meet the values in one's sociocultural environment, peers, or social setting. Surely, the chances may be higher for the creative manifestation and that it will reach validation by a wider audience, if the personality of an individual "fits in" to what is valued the most in the sociocultural environment at the current time (i.e. Zeitgeist) (e.g. introvert-extrovert controversy).
>
> Yet, the success is also dependent on other things than just "good, or positive traits"—it depends on one's intentions and goals, and exactly *how* the person attempts to seek approval from the public for their insights, ideas or solutions. **Being a cool or a creative kid does not guarantee success, but the actions do**.
>
> Since all of these are variables in the phenomenon of creativity vary from person to person and from culture to culture (and from time to time), paying attention on one's trait x scene behaviour and learning how to make adjustments on that, might be much more fruitful strategy to get one's voice heard.
>
> Moreover, if one is staying true to oneself (even if one is being controversial) but yet having a good sense of what the other people might think or feel it will most likely pay off and have other benefits—for oneself and for the other people too.

What is not pointed out clearly enough in popular stories about eminent creators is that the creative personality traits are the opposites of one another. **We may hold an ideal image of the Mad Geniuses in our mind—but those highly-creative people we cannot really relate to and what is worse, that false idea can make us think we are not creative or competent**. Neither of them were superhumans either, you know. Because socially admired creative personality traits depend on one's domain, there is not just one trait of which one should aim to possess. That is a bad strategy, and the most admired tendency will most likely change within the next decade or so anyways.

The historical burden on being creative

> "Defining creativity may be one of the most difficult tasks facing the social sciences, because everybody wants to believe they are creative. People typically use 'creativity' as a complimentary term of praise. It turns out that what gets called creative has varied according to the historical and cultural period." (SAWYER 2006, P. 11)

Throughout history creativity has been related to human embodiment, personality, or a specific skill or talent. No wonder that people have difficulties to describe creativity yet today (p. 16). The rich history of creativity theories has its varying concepts that talks about both, the creator and the creation (also creative act, or expression).

Yet today most of the people might hold the idea that individual's creativity aspires from a unique and inspired person who expresses and communicates one's unique vision. This ideology is no more than 200 years old—or actually, *it is 200 years old*. (SAWYER 2006)

Romanticists redirected the focus from collectively created solutions to individual self-expression. ***Individuality*** was a trendy topic back then. The idea of individual creator bloomed again among the personality theorists 150 years after the Romanticism, and is has been quite popular explanation for an individual's creative success since then. **Only very recently individuality on creativity has been questioned by the researchers**: As a matter of fact, any creation can be seen as a social product that has involved more than one person. Social perspectives on creativity proves that social judgements are just as important as the product itself, and the social judgement of appropriateness is essential for creative process and the solution (RUNCO 2007; SAWYER 2006; SAWYER & DEZUTTER 2009; SAWYER 2011) (IBID.)

Then why, yet today, creative people are ought to be or behave somehow different from the majority of the people?

The history of creativity may explain a few things: Varying conceptions have created some of the current social ***expectations*** towards eminently creative individuals as well, and those expectations seem to mature slowly. Yet today creative individuals are often described as people whose characteristics implies a tendency toward socially inappropriate

behaviour which, on the other hand, is quite essential for lateral or divergent thinking, as well as generating original ideas, insights or solutions. At least that is how it has been *thought* for the past decades; that unconventional or abominable behaviour indicate creativity.

For example, in 1975 Gough reported the results of one creative personality assessment like this: "Though there is a facet of high ego strength in this [lability] scale [in ACL test], an adventurous delighting in the new and different and a sensitivity to all that is unusual and challenging, the main emphasis seems to be on an inner restlessness and an inability to tolerate consistency and routine." (RUNCO, IN CITED GOUGH, 2007, P. 281). It does sound quite familiar description of a creative person doesn't it?

According to that and a few other lists, eminently creative people are indeed an odd mix, but it is a false idea that someone would need to stand out or fight the conventions in order to be creative or successful.

Creative people may appear an odd bunch but where did that idea came into your head?

It should be reminded that there are dozens, perhaps hundred of theories and models from the field of personality. The most widely studied and respected has been the five factor model (COSTA & MCCRAE 1999). A study conducted by IPAR and Helson (1999) found out that with *the creative people* "(…) the big five personality traits are neuroticism, extraversion, openness, agreeableness, and conscientiousness.".

Openness, that is referring to a sensitivity to fantasy, feelings, aesthetics, ideas, actions, and values, has been labeled as a ***"cardinal characteristic" for creativity*** (Helson 1999). The same cardinal characteristic has been used to explain substance abuse among artists. Another cardinal characteristic that was listed was ***originality***. (RUNCO 2007)

My +80 year old grandmother associates creativity more to "someone who makes and creates", to someone who is active. *Note:* The modern-day ideas of productivity and creativity are two different things in her mind. She did not distinguish that creativity would be linked to any particular domain or personality, nor that creative solutions would have to be big and spectacular. In her mind creativity just happens and manifests everywhere.

(Leinonen 2019)

However, it is questionable to use these categorisations and models to define creativity, because the so-called "creative characteristics" do not apply to every creative person—partly because in various studies the artistic and scientific creative tendencies are defined fairly contrasting ways. Also, often the same factor that evaluates personality traits or associates them as "creative" or "original", is the exact same factor that evaluates the appropriateness of one's solution and that is the sociocultural environment per se.

Thirdly, some of the tests are self-assessment tests (e.g. ACL) which may enforce the idea of self and how someone would like to represent themselves (RUNCO, IN CITED MACKINNON, 2007). Hence, that an individual either ***intentionally*** or ***subconsciously*** eagers to meet the needs of one's sociocultural environment.

Even though "originality" is highly valued in the contemporary world, and it is often associated with creativity, it has not always had such remarkable role in the history of creativity.

What if the idea of "originality" in the modern days is just another convention?

When investigating the scope of exceptionally creative people's traits or tendencies, there are some similarities. Yet alone, they are not enough to explain the whole creativity complex (RUNCO 2007). Creative personality traits may be paradoxical, but for the current public they may reveal familiar aspects what kind of a person is considered creative. Moreover, the public expects the creative person to be some particular kind of a person.

These particular characteristics, or tendencies, may have led some of the creative individuals to come up with successful solutions—or in other words, their traits and social behaviour, and the social setting especially, have allowed highly original thinking that have allowed them to generate insights that have been valuable for their social surroundings (i.e. gained peer support). They were allowed to follow their hearts and allowed to express the content on their TOP shelves openly.

They may have generated insights from the content that was in store; solutions that stood out from the mass or were unconventional (i.e. not following the social conventions). However, it is not that some particular personality trait would have allowed all that—the thing, that connects all of these stories, is that *these individuals were encouraged enough to act* and that is why they could have an impact to the society. That is the deepest reason why the stories of eminent creators are familiar to us.

There has been speculations whether some historical Mad Geniuses may have suffered from lesions or abnormalities in the brain—especially in areas that are responsible for socially appropriate behaviour.

If only this speculation could be proven today, in the light of what do we know about e.g. mental illnesses today, maybe that would explain the reason why they belonged to the minority of people, or why they were considered e.g. controversial, since the majority of people share similar brain structures.

Runco (2007) writes: "Apparently, individuals with particular prefrontal lesions have difficulty evaluate social judgments and rely on

the wrong cues when deciding what is right and wrong. (…) Yet more often than not, the unconventional tendencies of truly creative people are intentional and discretionary. (…) Creative individuals may be aware of social convention but simply do not give it much weight. Creative work may be more important to them than fitting in, so although they are aware of social convention, they choose to think in an original and unconventional fashion. Judgment is required for creativity—it is not lacking. Along the same lines, creative ideas are not only original, they are also fitting, valuable, or effective in some fashion. This all implies an intact and functional prefrontal cortex." (RUNCO 2007, P. 83–84)

That fine-tuned brain function that allows us to evaluate our deepest thoughts, also means that we somehow always conform to the rest of the people and take the other fellow human beings into consideration with all our actions—whether that is about shocking the other people intentionally with our creative powers or not. Runco continues: "Most psychologists recognise that human behaviour is a function of both stable traits and environmental, situational variables", and the surroundings can either facilitate or inhibit creative expression (RUNCO 2007, P. 297).

What is often missing from the stories of Mad Geniuses, is the role of inner motivation.

What if Newton was driven not by fame or fortune nor gaining admiration from his peers? What if it was the fact that his work would have high social impact—which, in this case, could be solely about having an impact that benefits the whole society? Maybe Newton had a strong sense of working for ***a greater good*** that kept him going.

Of course there must have been someone in Newton's social setting who facilitated and took seriously what Newton was suggesting about gravity—at least one person who saw pass his unadmirable social behaviour—that is, because his inventions are widely known yet today and they are still in use. We would not be familiar with these inventions if creativity was only about the personality, or the social status.

OH POOR NEWTON!

WHAT IF BEING AN ODDBALL IS NOT ALWAYS INTENTIONAL?

If it is really true how Newton described himself, that:
"I do not know what I may appear to the world; but to myself I seem to have been only like a boy, playing on the sea-shore (...)", he then shows how aware he was about the judgements that were coming from his social setting.

He also shows how he may have resolved his intrapersonal conflict at some point of him being a bit difficult as a person, but at the same time "just an innocent, playful boy"—that he had a firm sense of himself as a "creative".

Being aware of such social judgment (i.e. that he may not have been the "coolest guy") and the social conventions anyhow implies an intact and fully functioning prefrontal cortex, which suggests that Newton may have known exactly what he was doing.
However, what if he was not being "difficult" nor "rebellious" intentionally, then what boosted him to continue finding out what gravity is about? He already knew that he was not the coolest guy around and still fought against public view of the world, which most definitely would not improve his popularity among the other people.

Is it possible that he simply had a good hunch that his ideas would have high value for other people? Perhaps he had an internal motivation because of this strong intuition that his solution would fit—if not on his own social setting then to somewhere else or at another time.

No matter how asocial or unlikeable person he might have been, or appeared to his peers, he somehow *knew* how to go pass that—and he, with himself, had found **serenity** and was able to continue his work until the real big breakthrough.

THE SOCIOCULTURAL APPROACH ON CREATIVITY

Around the same time when personality theories were blooming in the 1960's, Csikszentmihalyi's personal attraction to theories about peak experience, inner motivation, self-actualisation in creativity assisted to discover what kind of a person was most likely to gain successful careers (in fine arts).

It appeared that the people who focused on their intrinsic motivation and enjoyed the joy of the "flow" state while working—and who, by this behaviour, generated works that were appraised as highly creative were the ones who succeeded. In other words, the people who found a place for their work in the society and gained public appreciation, the people who focused on things that mattered the most for them per se, and the people had fun while doing so.

After these findings, **Csikszentmihalyi then continued his studies on creativity which assisted finding the sociocultural approach on creativity in the 1980's and 1990's** (Sawyer 2006).

However, the thing is that we love stories.

We love heroic stories. Still, they are just stories—tiny glimpses of history that are missing a lot of data. Even more than often, these stories are not reflected on the particular era nor the sociocultural environment where the protagonist lived in.

Yet, we still look back e.g. to the daily habits of the famous inventors, writers, poets, artists and so forth, and compare their worlds with our own. We look at them with an admiration, and try to find any "errors" from our own daily habits that might inhibit creativity from flourishing.

No wonder, why some people do not feel creative enough.

Why "being like anyone else" does not indicate creativity in popular stories?

One might compare themselves or their behaviour to Mad Geniuses', who are, and have always belonged to the minority of population. One may not suffer from any mental illnesses (like e.g. Van Gogh), or have a drug problem or suffer from any other substance abuse (like e.g. Hemingway).

One may have never experienced the major crystallising experiences which are often mentioned in famous creators' biographies, like some of the eminent creators had. For example what is told, is that "Einstein was apparently drawn to physics after he was give a compass by his uncle. He was fascinated by the invisible force at work, directing the compass needle.", and that was his crystallising moment that led him to find out more about "the invisible force". The other story about these crystallising moments is about James Watson, who shared the Nobel Prize with Francis Crick for their work on DNA and the double helix. Watson himself, gave a great weight to his mundane reading experience with a book called "What Is Life", and said that "from the moment I read What Is Life I became polarised towards finding out the secret of the gene". (RUNCO 2007, P. 50)

So perhaps we are doing something "wrong", because we, ourselves, have not become the next Steve Jobs (yet)? Or are we? It may be that we do not have to work from the garage in order to find the "next big thing"—and instead, we go to our rather ordinary jobs every morning. It may be that someone even does not have a job.

It is true that the social environment plays a huge role in how creativity manifests in each of us, but any constraints, difficulties nor tragedies in life do not take away the creative potential we possess. Yet, either do social status, nor any "cardinal characteristics of creativity".

What matters are the individual goals and intentions, and *if* a person even wants to gain any fame and fortune. Sometimes that fame and fortune are secondary goals or no-goals—sometimes the idea is valuable only for the person per se, because it helps that person to cope.

Intrinsic creativity assists us to cope in day-to-day life too, from social interactions to tapping into our own imaginary worlds (i.e. the ability to daydream) which are beneficial not only for one's own mental health, but also for the flexibility of a thought. Creative thinking does not always lead to socially-validated major breakthroughs and it does not need to. Surely, minor insights that have minor impact do not end up in history books, but they are just as essential for ideal solutions.

> "You have to be in a state of play to design. If you're not in a state of play, you can't make anything." —Paula Scher

> A friend of mine drives a forklift for work. (Definitely not a job that would be considered highly creative by the current society, is it?). He absolutely hates his job. However, since he told me that he has no opportunity to change jobs at the moment, the thing that makes him bare it on a daily basis is that **he imagines everyday at work as a game**. His long-term goal is to open his own restaurant at some point, and that he goal he keeps clear in his mind.
>
> Even though his inner drive may be aimed elsewhere than on his current occupation, he tries to have fun in the meanwhile—while being persistent with the intentions he has. That is what creativity is about too, sometimes it can be indeed just about finding a state of mind, or an ability to daydream. That type of creativity keeps us focused and driven with our long-term goals, and it brings patience for one before those goals become true.
>
> What is more is that I wish I had heard about my friend's mind game years back, when I myself struggled with my job (read: career choice). The same realisation: Turning daily tasks into a game in my head, took me 2 years to internalise. My friend, on the other hand, had figured it out in less than six months. If we had met back then when I was struggling (in 2014 and not in 2019), and if he had told me about this insight that makes him cope each day, his idea would have instantly become socially valuable. At least for two people, him and I. And this example, that is an example of how minor creative insights can turn into something more significant.
>
> *Edit: My friend has bought his own restaurant in April 2019.*

"Functional" creative self-confidence begins from practicing authentic creativity and having a firm sense of self as creative.

I recall that "it may be useful of investigating the combinations and interactions among eminently creative people's traits, attitudes, habits, abilities, and values" and by that I mean that one may become more aware about one's own tendencies, which can be turned into tactics that are useful for generating insights despite how big or small the goal may be.

THE SHAPESHIFTING NATURE OF A THOUGHT: HUMAN INTERACTION & THE ORGANIC EXCHANCE OF DATA

In a nutshell, with the idea of the shapeshifting nature of insight, an idea, or a solution, I theorise the possibilities of collective creativity. For instance, with the idea I emphasise the importance of expressing ideas to others without thinking whether or not it fits to the social setting.

I truly believe (and I have observed this phenomenon in action too), that sometimes expressing minor ideas (like e.g. changing opinions) may benefit just one other person who then comes up with a creative idea.

Sometimes, such a simple thing like increasing human to human communication and interaction, can generate insights that have more significant value for a larger group of people. I believe that this kind of organic interplay of data profits from the diversity of people: People that come from different backgrounds, with different personal histories, and with the multitude of personalities of their own.

"Creativity *is* a state of mind." –HANNA JOKINEN, UNIT DIRECTOR & STRATEGIST, ADVERTISING AGENCY ILME

No-idea is *worse* than wrong idea.

The unequal distribution of the asset of human creativity

Someone may feel inspired by famous creators' traits or habits, and inspiration is a great kickstart for action. However, one may need to tie these characteristics or routines with creators' era and sociocultural environment though—only then the tips and tricks of eminent creators' can be adapted in one's daily life in 21st century world. When eminent creators, their solutions, and the major sociocultural events are put on the timeline the data points out a few things:

- Which topics were "in" or trendy at time. Which solutions needed and succeeded, and were accepted to fit in to the society reveals e.g. particular era's value system;
- What kind of creativity was appreciated; artistic or scientific oriented creativity; the brain and reason or more emotionally-related manifestations—or was it even appreciated,
- Who were the creators in that era, and how they or their production were described; e.g. through personality, behaviour, talent or inventions.

Even the dataset that is placed on the timeline is oversimplified and insufficient to draw any scientifically valid conclusions, it does give a rough idea about how the creators at each of their time may have scrammed a bunch of habits or routines into their schedule. The different structures of their own sociocultural environments may explain, how their habits were supported by the Zeitgeist—how the Zeitgeist supported their creativity.

Additionally, when investigating the timeline, it suggests what could be the hot topics or issues that could be addressed now at the current era. However, **the timeline is highly biased as it is depicted in this publication**. When I began collecting the data, I only had a vague idea that it might be possible that the validation of each famous invention, or eminent creator, may correlate with the sociocultural needs (RUNCO 2007). However, the format of this publication is insufficient to depict the variety of the data that I collected, and therefore it is only meant to point out the conventional features that are involved with the phenomenon of creativity.

> "The reward, evaluation and validation depends on the Zeitgeist: in a Zeitgeist that favours creativity, individual with obvious talents will easily find careers and perhaps economic stability. Contrast that with a Zeitgeist that favours conventions and conformity.
>
> (…) The point is that Zeitgeist is a useful concept that allows us to understand the past, but it is more practical than that because it helps us to consider what investments and behaviours will be appreciated and rewarded." (RUNCO 2007, P. 260)

Runco reminds that the historical analyses can highlight biases of the present, but we should be careful when interpreting them because they will colour our conclusions and the interpretations can be difficult to be kept objective. For example, that depends on which indicators (e.g. productivity and reputations) are used to evaluate creativity within each era. (RUNCO 2007)

Like in any science, the yet-incomplete science of creativity also appears to have some progression and continuity besides a few "side tracks" it has took.

The public opinion and conception on creativity seems to go hand in hand with global issues and major sociocultural changes—profound societal needs for creative actions, as much as they interact with industrial and technological advancements too. (Almost) throughout the whole history of creativity, the phenomenon has been linked to people who made some sort of impact to the society.

This could explain why creativity studies have focused especially on arts and science, and not so much on everyday creativity. Yet, the majority of the creative capacity lies within the everyday punsters.

It is obvious that the both groups of artists and scientists represents minority of the population—the majority of people are not artists nor scientists in the society.

However, even their social statuses have changed and shifted throughout the history. For example, artists' role has been interpreting and recording the evolving world around them (by using their senses), and trying to translate the complexity that they perceived into something more understandable or tangible for rest of the people. Famous scientists in all times have worked with the similar kind of complexity. They are known to put their own energy and effort for finding solutions in constantly changing environment—the solutions or inventions that, at least in some way, fit or improved the society at the time.

However, both of these domains that are often linked to creativity per se, ultimately **represents an action or a goal to make some kind of an impact or a change**. According to history books, the individuals who had their voices heard, and their messages conveyed, were the ones who made an impact.

Perhaps there was something in the social environment, that made the eminent creators personally feel that is missing or that is flawed, and felt a need to fix it. It may be that there was something that did not meet their own core values, intentions nor goals—that maybe they tried to fix something in their own lives, but then they became famous because their creation became all of a sudden useful for other people, too.

It may be that they became famous, because they knew they had something valuable in their hands and in order to make other people to see it too, they had to take unconventional or even drastic actions—but they became mostly known for their controversial natures as human beings.

Whatever made them to take action in the first place; whether it was an internal need, personal benefit, a clear goal, or an inner motivation that may have kept them going the only reason why they became "famous" or "popular" though, was that their manifestation resonated to a wider audience. The creation was useful for the sociocultural environment.

What the timeline suggests is that it is not only the sociocultural events or trends that have influenced on the conceptions of creativity. The ways and the tools how we communicate (i.e. exchange data) also seem to have impacted on the phenomenon of creativity.

People has a power to change the sociocultural environment even rapidly

The advancements in communication technology has made exchanging the building blocks for generating creative insights more possible than ever before. However, I argue that today, the social statuses may play a great deal with who is allowed to speak their mind, who is taking action, and whose voice is heard. Moreover, when we are gathering information—the building blocks of human innovation—there should be a common cause where to aim the combinations that the mind is able to generate, the power to turn ideas into tangible objects.

Furthermore, since everybody has this ability of human creativity, people should be educated how it works at its best, in a sense that we generate long-lasting and beneficial tangible objects. However, many people do not even acknowledge that they have this built-in ability. People perceive creativity in numerous ways, and not everyone's creative potential is even supported by the sociocultural environment from the start. Their creative potential has vanished into white noise.

I consider that since human creativity has already proven its power in generating magnificent inventions that has helped the sociocultural environment to grow, the communication about the creativity per se should be increased. People should be more aware where to find the right pieces of information, which building blocks to choose and which ones should be filtered when we are talking about human creativity.

The human brain is an evolving organism, but it is adapting so slowly that in the meanwhile, the ones who were born before the Age of Big Data, could especially use some extra aids for critically viewing what they see around—especially if the information is rotten and should not be swallowed so easily. That is, because they may unintentionally pass on the same information that has been fed to them.

"Liberating creativity" in a way that it would available for everyone, would require a whole lot of actions. Not only from shedding light upon how algorithms direct perception. It would not only require improving the communication between the creativity researchers and grass-root level, or media, but it would require a whole lot of actions also from the individuals living in the sociocultural environment—the sociocultural environment interacts with them and vice versa.

What if creativity was educated from an another angle for the youth, the next global creative elite? That being creative is not just an ability to come up with many unconventional solutions (i.e. original and novel) but

that it is more than just that: Human creativity it is an ability to produce high-quality solutions, and that the last variable of something useful, valuable and appropriate, would be on the main focus.

That would require a change in attitudes, that: In the future, the success of a person and one's creative solutions are solely measured by the level of an impact, and the benefits of the solution for nature, social environment and fellow human beings—not by its originality, novelty, commercial impact or entertainment value nor for example, or how much fame it has brought to an individual.

Team up for getting the message through!

Furthermore, today when information is mostly online, there is a high risk for misinterpretations. One simple reason is **the lack of human interaction and the bodily cues that we exchange unconsciously during human-to-human communication**.

An everyday example of this is when simply individual mood affects on how we interpret a text or an email, for example. "Given the number of stressful situations we encounter and the angry or anxious thoughts they generate, this response [stress] can prevent us from resting and restoring ourselves" (e.g. the brain cannot go back to responsive state which increases) (SEPPÄLÄ 2016, P. 48–49). In the world full of negative news that increases anxiety and lowers higher-thinking skills one may need to seek for inner balance and own ways of staying calm. But there is also a bonus side of this restlessness: It increases action.

Putting "an angry text" in to a larger scale—the final call about the state of climate change that Intergovernmental Panel on Climate Change (IPCC) gave in October 2018—that included over 6,000 scientific references from almost a hundred neutral scientists from 40 different countries—became a mass movement today, a global reaction that originates to "just" online information. But what an impact several individuals teaming up had!

Now we are talking about climate anxiousness, and we are organising demonstrations—now, we are taking *action*. Why they were not taken seriously before? This was not the first warning they gave. Furthermore, the question is that what will come next; how exactly we are suppose to act in order to prevent climate change, and how big of a role the Big Data has with these actions? It is unlikely that this time only one person could fix these issues. Could harnessing collective creative capacity response to current societal need of climate change (alongside with the other major on-going events*)?

* e.g. the warning about the sixth mass species extinction, May 2019.

First image of a black hole from EHT Collaboration, 10 April 2019 (ESO 2019).

Understanding the phenomenon of creativity requires an understanding of the whole complexity of human embodiment on its biological, psychological and physical levels, but most of all—understanding us as social beings. When explaining the very basic creative process, it should be got straight, that it occurs in many situations in the everyday life, too. Creativity is not only about creating the next big thing, but it can be about that too. However, without exchanging everyday insights (e.g. via human-to-human communication) creative solutions cannot exist either. Creativity is not only artistic expression arising from inner inspiration (e.g. Van Gogh), or (shady) lucky coincidences of falling apples that ignites sudden Aha!-insights (e.g. Newton).

Creativity is not only generating successful insights or innovations one after another. Also, an innovation can be initiated from surprising starting points.

Now, when everyone can have a voice, a possibility for an impact, then what could increase that the actions take place?

If the rapid increase of inventions keeps on increasing, and more actions take place then how the quality could be surveilled in so that the solution will not become a problem in the future?

Society has always defined some traits better than the other, and many people have a need to meet these expectations (or the values in the societal atmosphere). People may compare themselves to other individuals, and whether or not they fulfill the expectations to same extent. The concept of creativity, however, is not only dependent on an individual. That consensus forms from all various views on creativity, no matter whether they are "wrong" or "right", and language reflects these views. In fact, I consider that the spoken language may even predict the direction where the concept of creativity is going to (e.g. today the word "creative" can refer directly to the person who is working at the field of marketing, for example). There is more than one facet that defines what is creativity, or who can be creative.

Even though creativity researchers have been able to get closer and closer with cracking the tough nut of the human innovation, it does not mean that even those views would be stable nor "true"—these theories and studies develop together with the sociocultural environment as well.

> At this point I had to remind myself again, that ***all* of the facets are vulnerable to the same brain glitches that can limit human perception,** and the ability to distinguish right (data) from wrong (data). Social metacognition is not somehow "smarter" than an individual. Yet, sociocultural environment is what defines creativity, and forms also the concept for an individual who is living in it: The dominant idea about creativity, defines who is ought to be creative and who can make an impact on one's social surrounding in return.

The only stable element in the phenomenon of creativity seems to be the human embodiment.

In this sense all the existing explanations about creativity, even the most confusing or conflicting ones, are true or at least partly true. They can be be true for just one person, or a range of researchers. We all form our own ideas about creativity and how creativity is manifesting from within. Functional creativity may require that at first, one acknowledges and overcomes their own personal biases.

Establishing a neutral ground for creativity could produce more reliable information, and minimise the likelihood of biased data.

> "Many studies of creativity are limiting their studies to "high" forms—to fine art painting rather than decorative painting, graphic arts, or animation; to basic science rather than applied science, engineering, or technology; to symphonic compositions rather than the creativity of the violinist, the ensemble interaction of a chamber quartet, or the improvisation of a jazz group—these researchers have implicitly accepted a set of values that is culturally and historically specific. **These biases must be discarded if we want to explain creativity in all societies, in all cultures, and in all historical time periods."** (SAWYER 2006, P. 5)

The particular social statuses and vocations have especially had an impact on the studies in creativity, or the studies have been biased by their own intentions and goals. The older studies had preformed an idea what they *should* be looking for—even though today we have the opposite knowledge on that.

How much the older studies in creativity influence on the public opinion?

Could the most recent findings break the most persistent myths; for example, that creativity is only artistic or scientific, and that it belongs to only particular people?

Naturally these particular "older studies on creativity" resonates with the public, and those biases can be seen in the current attitudes, too. The previous studies may have made it more easy to point out what is creativity, and who is creative (i.e. who works in the "creative field"). However, this is exactly what neuroscientific studies are trying to fix about the conception on creativity. They provide empirical and neutral results about human creativity, and the studies are based on the things that connects us as human beings, not on what differentiates us.

However, because of the contradicting ideologies within various decades—when ideas about creativity have mainly focused on a small creative elite—the research that is done today, is yet partly resonating these ideas. For the purposes of this study, it was rather difficult to find empirical studies that would involve regular and non-trained people. It

was even more difficult to find empirical studies that would involve groups that would have been measured together when they are generating insights (To be honest, I found none, but maybe I did not what to look for or the technology does not exist yet that could measure how human interaction affects on insightful thinking.)

There are no completely clean slates
nor non-biased viewpoints on creativity
(or on any other matter).

The data indicates similar results: How we are communicating about creativity today, seems to have roots in the late 20th century. Sawyer points out the same thing that "up until the 1980s, whenever psychologists studied creativity, they focused either on scientific innovation or on the high arts most valued in Western culture." (SAWYER 2006, P. 6).

For the reasons mentioned in previous chapters and the reasons above, I see no point why the discourse about; "what creativity *could* be in the future" or that "what kind of creativity *we would need* right now", should be limited.

Instead I see a need and an opportunity to raise these questions, especially among "regular" people. Before any drastic changes can happen with the phenomenon of human creativity (e.g. people's attitudes), **the completely creativity-friendly environment that would increase the capacity of collective creativity seems to remain as utopia**.

In creativity-friendly environment there would be no more social statuses for defining what is creativity or who is creative. There, artists and scientists for example, would invite ordinary people to see what they have created, or make them to participate in what they are currently doing: Showcasing that creativity manifest in various ways, would be then more transparent, and mixing up different people with different social statuses could show that there is nothing magical about it—and that creative talent can be trained. That would break the last existing domain borders around human creativity. Furthermore, that would improve the collective evaluation of the results, as well—it would increase the quality—the social value of the creation itself.

Creative fields would not exist, and foci would be on the goal, e.g. a solution that has a positive impact on its social surrounding. In that environment empirically proven results about human creativity would make it to the headlines, and stories about these findings would have media

value without them being exceptionally media sexy. This environment would communicate better about what is *just a story* and *what is real*, and the popular media would support that goal; in assisting people to distinguish the difference between these two.

In creativity-friendly environment there would be more clear set of rules (i.e. more conventions, obviously) about how facets are communicating about how something so human—creativity. They would tell how creativity per se, can benefit an individual wellbeing. They should clearly point out what is required for insightful thinking, and which factors determines the success of an individual. Everyone should have a chance to harness their creative potential and enhance the capacity of creating.

Collective creative capacity
is a low-hanging fruit.

And...

...world peace.

Changing people's attitudes does not happen over night.

What comes to creativity and persistent ideologies around it, it might not happen even in a hundred years. Each dominant consensus (or trend) seems to have followed a lengthy pattern, compared to for example 10-year-cycle in fashion industry.

What if creativity was just another subject at schools? That kids were taught, how important it is to keep on playing with thoughts all the way to the adulthood, and that their ideas should also take the other people into consideration?

What if creativity couching begin from explaining that if one really wants to tap into their inner worlds, that can generate unconventional ideas, then all they would need to do, is to trust on what they already know and build their cognition with ingredients that may be missing? That only after acknowledging all that data, they can begin generating more high quality insights—insights, that stems from one's own databases and that the process itself requires them to rest and incubate.

Productivity and high-quality creative thinking are an impossible equation.

WHAT IF DISCOURSES ON CREATIVITY WOULD BE INCREASED IN HUMAN-TO-HUMAN LEVEL AS WELL?

Creatively trained people are yet much needed—your career is not in jeopardy, but the general ideas about creativity are.

What I have noticed during my career is that more than often, when there is a gallery opening or an art workshop, for example, the people who get the invitation and who participate in these events are rather homogenous group of people. I see that this rather-new-convention is only enforcing the borders between creative fields and the regular people.

Has limiting *the availability of art* always been the purpose of art? No. Art used to be a way to communicate valuable information for a wider audience; it used to educate people, or just simply, provide entertainment and a place to escape the routine.

I, as a visual designer, see myself responsible for openly communicating about the field of design to the people who are not involved with it. Moreover, I feel that it is important to encourage people to enjoy art and design, or to assist them to pay attention to what or how they read the popular media, for example. At the end of the day, it is the other people for whom, and why I am practicing my trade—without them, nor *their* internal needs I would be unemployed. Why I wouldn't make them to be part of with what I do?

I am aware that for example revealing "the secrets of marketing" (it is not rocket science), or even advising people who are not working in the field, may lower my own social status among the other creatives but I think there is no competition that kind. To be honest, I do not believe there should be any competition among the creatives either—yet, we still compare each other (maybe even more than some other social group would do).

In the future, us creatives are going to be just as needed—because we are trained for generating creations systematically. It is unlikely that anyone could become equally informed within a few minutes or even few days, that would replace years of education and training all of a sudden. Yet, for someone who is not in the field, our advices can spark ideas and change they way how they explore the never-ending feed of social media, for example.

> Furthermore, communicating about the field can concretely point out that there is nothing magical in creativity—a creative job is just another vocation, and oh boy, it demands training and nerves. Moreover, those nerves break down sometimes. The creative domain requires a h*** of a lot of courage, because you and your creations are always under social evaluation.
>
> Therefore, I would like to see more creatives teaming up. Not even one creation should be done alone. If creative experts would fearlessly and more frequently team up, and for instance not think too much who will have an authorship in the group, it could lead to something pretty great.
>
> Since the field of visual communication is seen as "highly creative" (emphasis on; in current Zeitgeist), I see a responsibility to communicate about what "creativity" particularly means, or how it manifests in this particular trade. It may be just a small act to correct persistent misconceptions about the field, creative stereotypes (us creatives), and also about creativity per se, but it still is an action.

Sawyer argues that it is a myth that everyone could be creative and that it is pseudo creativity: "The American ideology of democracy is the deep-rooted belief that everyone is equal. This ideology leads us to fear making value-laden distinctions, so we tend to believe that everyone is creative, and that no one should judge what counts as good art, or even what counts as 'art'" (SAWYER 2006, P. 22).

However, because **creativity is not only about artistic talent nor aesthetics**, he adds a point about the bias among trades: **All creative works need to be evaluated from vocation's perspective**. It must be taken into consideration "(…) how fields decide which works are more creative. The sociocultural approach explains why these critical selection processes are not opposed to creativity, but rather are a central part of all creative activities." (SAWYER 2006, P. 23). Yet, this idea is valid only if we are talking about collective creativity, and not individually generated creations. In the latter one, the role of an individual expertise is actually much bigger what comes down to creating ideal solutions.

I consider that what comes to art, there is no such thing as pseudocreativity, and even outsider art *is* creative. The creator might be only missing the conventionally defined social status of who is considered creative.

The sociocultural environment defines what is high-end creativity, or admired and desirable traits for creativity, and surely one can learn and take an advantage from the habits of the old school Mad Geniuses, but that does not necessarily mean that the society would appreciate those habits today. There is a link between then and now, but today's creativity differs a whole lot from what used to be considered creative. Also, the meaning of "creativity is a valuable asset" has changed over time and it means different things to different societies—for example, art has not always been a valuable asset.

> "(…) various cultures seem to have idiosyncratic modes and media for expressing creativity. (…) We have an obligation to make an attempt to fulfil creative potentials. Creativity is, in a phrase, a vital form of human capital. Creativity both contributes to the information explosion and helps each of us cope and adapt to it." (RUNCO 2007, PREFACE, IX,)

The creative potential is out there, in every one of us, but many people's creative self-image and self-confidence may have suffered a few hits within the last 200 years which prevents harnessing the full creative capacity.

We might need to start taking better care how we use the word "creativity" in order to fulfill the creative potential.

That might be the first, and the most simple step to correct misconceptions in grass-root levels. The word can mean several things, and if there was more attention paid on the situation that what kind of creativity we are talking about in different channels; in human-to-human interaction, in media, and with the findings of creativity research, the vagueness that is still lingering around the phenomenon would start to fade away a little by little.

For example, creative agencies and creativity training will be much needed in the future too, and it is not all faux. However, what they are selling is not "creativity". What they are actually selling is creative

products that are generated by the experts: The fully chewed ideas that human mind is capable of producing—served on a silver plate.

Additionally, creativity training is be more about enhancing divergent thinking than enhancing creativity per se: Training the neural circuits that are responsible for spontaneous information processing—routes that already exists, but may need some unlocking before they can be fully taken in use. Art therapy is not only about some "bohemian" directing individuals to express themselves through uncontrolled brush strokes—it aims to people unlock the emotional areas in the brain as well.

All of these attempts to enhance creativity is about guiding people how to take each neural circuits in use, not about "creativity" per se, because that, that is intrinsic and a natural add-on in all human beings.

I believe that if we continue to (over)use the word "creativity" in every single turn it will lose its power eventually. People will get bored about hearing the word because often times it is something that they cannot relate to. Even more often, it is so vague that we all get easily lost in translation, and we might not even talk about the same thing when we are discussing about "creativity". "Creativity" can indeed be about the creator or the creation, or an asset.

Runco has acknowledged this issue as well: "This difficulty [to define creativity] is due in part to its diverse expression; creativity plays a role in technical innovation, teaching, business, the arts and sciences, and many other fields. Many famous people have earned their reputations from their creativity; it is sometimes related to expertise. Other adults are highly creative, though perhaps is the everyday sense of coping, adapting, and solving novel problems. Although there is controversy about children, (…) all children are creative, though the degree of potential may vary from person to person." (RUNCO 2007, PREFACE, IX; P. 290)

With every trend there is a countertrend, and I see no exception with an on-going "creativity-trend".

Research needs its frame of measuring something original and novel, but should the other facets have more neutral ground, and pay attention that when communicating about something different or unforeseen they are not necessarily synonyms for something *creative*?

Language and communication are powerful tools in shaping sociocultural environment and if we do not pay attention what we say and to whom—if, for example the word *creativity* is planted in every field of study, it can either become an asset that only particular trades can harvest, or it will lose its power completely.

All in all, creativity is yet ought to be "something different" that only particular type of people possess (e.g. a person who has distinct characteristics that enables an access to creativity). The idolisation of creativity becomes even more obvious, if one is looking at the individual features that describe creativity in the 21st century: ***Inventiveness, spontaneity, originality, empathy, resourcefulness, self-reliance, creative, spirituality, individuality, intellect***. These are all socially admirable or desirable traits of the Zeitgeist, and these traits seems to be considered to indicate creativity yet today.

I argue, that it is quite easy to point out whether one is affected by the romanticist or rationalist ideas in the 21st century. Biases becomes obvious when this ten-word set is compared to what kind tone of voice their antonyms have.

Creativity is socially admirable personal asset. However, apparently not everyone can have an access to that asset if they do not possess particular characteristics—really?

Does the following set of words sound like words that would indicate creativity, or words that would be used for an appraisal of one's creativity: ***unimaginative, deliberate, imitative or uninspired, aloof or insensitive, unproductive or dull, dependent, rational, conventional, ignorant?*** (ANTONYMS FROM MERRIAM-WEBSTER AND GOOGLE).

The tone of voice with these antonyms is rather negative, and almost all of them describe a person who is most likely considered uncreative in 2019. However, some of these antonyms were considered "creative" in the past. That depended on which ideology was dominant and "in". From the Aristotelian point of view most of these characteristics are quite cool and do indicate creativity as well (e.g. imitative, insensitive, rational).

Our current language suggests that the Mad Genius myth still lingers in many social settings and in various societal levels, including the modern creatives too (i.e. artists, designers, marketers and so forth). The myth influences even more in grass-root level—among the regular people who look up to modern creatives' superhuman talents.

"CREATIVITY" IS A CONVENTIONAL, UNSTABLE, AND SOCIOCULTURALLY DEPENDENT PHENOMENON

> It is rather interesting, that when most of the personality tests were developed in the 1960's, the tone of voice in describing "creativity" and "creative" has completely different tone compared to the 1950's—the decade post-war. It seems that rationality is replaced with romanticists idea about spirituality.
>
> Maybe for this reason the "research indicates that the [creative] traits or tendencies do not guarantee creativity, and many individuals have the traits mentioned earlier, but do not perform creatively" (Runco 2007, p. 296). These traits that are used for describing creative tendencies, do not show stability over time; not with what comes to an individual personality, not with the personal talent, not with one's domain, and not in the sociocultural environment. The phenomenon shifts its shape according to its environment, and according the individuals living in that environment.

Media can have a high impact on the popular ideas about creativity.

The current Zeitgeist allows more and more possibilities to search and digest highly biased knowledge, that is aligned with our own world view. Also about creativity and innovation. There is a lot false and pseudoscientific information available, that enforces biases in creativity, and most of these biases are still very much affected by the last 200 years.

Mass communication is not only a bad thing for correcting conceptions on creativity, because it is an opportunity as well. However, the way how we communicate, and spread information about creativity, should have more attention—every time when we open a door for one, we close the door from someone else. If we describe creativity solely as "something different" or shocking, it closes the door from conventional or "dull" people. It prevent them acknowledging their creative potential for a heavy reason: They cannot relate to releasing bursts of crazy ideas, or breaking the rules of the society (if I may exaggerate here a bit).

Without a doubt there is entertainment (and economic) value in all heroic stories—and in the stories of the crazy or unconventional eminent creators. That value becomes rather evident, if we are only looking at the amount of movies that has been produced about them only within the last decade: Steve Jobs (2015), Stephen Hawking (2014), Thomas Edison (2017), Van Gogh (2017, 2019)… But what kind of messages these stories are sending?

That is that we have particular stereotypes that we look up to, the incarnations of hard work or pure luck—the creators who were hit by a creative lightning.

These stories often celebrate creative victories (e.g. generating innovations) from a very individualistic point of view too. Very rarely the whole process is visible, and even more rarely other people that may have contributed on an innovation are part of the story—or if they are, they are just sidekicks, not the real heroes.

Artistic stereotypes' depictions often involve mental illnesses and eccentricity. For example, musicians, painters, writers, and so forth, are often depicted being somehow different from the rest of population. In the stereotypical stories about scientists, who barely ever have any dramatic individual features, the protagonists are depicted more than often through personal hardships, or (sob) stories—sending a message that like a Phoenix, they arouse from the ashes. Per aspera ad astra, right?

Even though the goals of these stories might not be only to gain economic profit, and they may also try to inspire a wider audience and show characteristics, routines or habits, that we could maybe relate to and that could inspire us with enhancing our ***creative productivity***—but yet again, are they relatable *enough* considering the world today, and are they really supporting what would be required for harnessing creativity?

In the light of neurobiological studies, all of these depictions are disadvantageous for insightful information processing.

For example personal hardships, high-intensity emotions, busy and hectic lifestyle (or excess productivity) are all harming the process of generating insights. "Drama" decreases the quality of insight.

I guess a movie plot that would have Edison sitting down by his desk for an hour and 40 minutes, working and making 10,000 inventions that did not work out in the end, would not be considered as a good movie, would it? The important role of incubation in the creative process is often diminished from the heroic stories, which can make some of the people think that they are somehow less capable—or worse, less creative.

It is not easy to distinguish what are just stories, and what is real, because this type of information has existed longer than the people living in this era have existed.

Moreover, this data has been the most accessible external information about creativity that has been available for decades for the public to digest.

In the light of creative self-confidence, the misleading depictions only gets us farther away from an attempt of making everyone able to relate to "creativity". People might not see the point why they themselves should try to harness their own creative potential, because they might not possess enough "features" that allows creativity to manifest in the first place. There is a gap between the creatives and rest of the people, and that gap has formed by sociocultural conventions on "what is creativity".

Today, creativity is a demand in personal and work life. Simultaneously the current society depicts hard work, productivity, and emotional distance as shortcuts to gain appreciation—even though they are detrimental for insightful information processing.

There is a massive contradiction between the social idolisation about "anything different" and "efficiency"—meaning the correlation of creativity and of productivity. This equation does not add up: Long to-do-lists and the need to prove one's social value through grooming, fitness and diets is eating time from creative thinking (SEPPÄLÄ 2016).

The brain works like time. It is limited. The time you spend on something is always away from something else. When some areas in the brain are active, it reduces the activity on other areas. For example, if one wants to become more creative in a sense of divergent thinking, they may have to give up on something in order to make time and space for nonlinear thinking that requires mind-wandering.

However, does daydreaming fit in our modern world because it takes time and it is not seen an efficient act?

If one seriously wants to meet the traits that resonates "creativity" in contemporary world: Inventiveness, spontaneity, originality, empathy, resourcefulness, self-reliance, creative, spirituality, individuality, intellect, then one may have to recheck what is on their to-do-lists as well. On the other hand, in the light of the recent studies, being true to oneself and not changing a single bit about how they are, is just as essential—no matter how conventional or dull they may see themselves.

Insightful information processing requires deliberation, rationality, and social judgment, and these can be taken in use only if to-do-list has

some spare time for reflection—a calm state of mind, a responsive state of the brain (DIETRICH 2004; SEPPÄLÄ 2016).

> "What prevents adults from enjoying the resilience children—and even animals—seem to tap so easily? Why does our stress linger so much longer than their, sometimes becoming chronic? (…) Popular messages encourage us to live in overdrive, making it all the more difficult for us to return to a calm state." (I.E. "RESILIENCE SABOTEURS") (SEPPÄLÄ 2016, P. 47)

Are the messages that are fed by the popular media today the same ones that at the time of Mad Geniuses or Renaissance men? Have the brain of Renaissance men been asked to produce divergent ideas under such a great pressure as we are facing in today's world? The evolution of the brain is dragging behind, and the brain simply cannot meet all the requirements that Big Data Age is demanding.

Human embodiment is limited and you can only pick one: Creativity or productivity.

Unfortunately, the human brain capacity is not yet developed enough to combine these two contradicting and yet admired characteristics; generating original and novel thoughts, while trying to meet the standards of being productive. Either one of these abilities will suffer, and depending the one that we do actually meet, is defining if we are considered to be creative or not—what a dissonance that builds up within ourselves.

If unconventional thinking is the thing that our current society would need right now, then why not pay attention on things that would improve that ability? Moreover, I argue that admiring *spontaneous*, unconventional thinking may lead us to repeat the same mistakes that we did in the past—we will just fix the modern problems with bubblegum, and that kind of solutions will not hold for long. **However, that is only utopia.**

It is utopia of the creativity-friendly environment, where every single one of us would be participating in developing the next big C's; the historically significant solutions that have major societal impact. Yet, I consider that it is crucial to tell each person of this planet that they still do possess the same ability than the global decision-makers of today do. Acknowledging the readily available built-in feature of human creativity and what that ability is capable of, can indeed encourage them to harness the full capacity. Most importantly, only then little strokes could fell great oaks. Human creativity does not thrive behind the closed doors nor tiny offices—instead, it thrives from interaction.

Furthermore, because this magnificent built-in ability functions in a similar way in all of us, it makes us think quite alike, too.

None of the great minds is ultrahuman. *None*.

(…) The world could be a very different place—a more entertaining, productive, and efficient place—if we each used our full potential." (RUNCO 2007, P. 40)

CONCLUSIONS

This exploration with *the phenomenon of human creativity* has been full of surprising discoveries.

I will argue that if the full capacity of human creativity wants to be harnessed then it should happen within the limits of human embodiment. Even though Andy Warhol has once stated that: "I want to be a machine", the thing is that we are not machines. That was not what Warhol meant. Today we have more knowledge what is required for creative thinking from an individual. However, that knowledge has lost in the white noise and the creativity research, the scientists, has not been heard.

The main finding of this study was the major contradiction what comes to how most of the people perceive the whole phenomenon of creativity. In the Western culture we tend to validate rational thinking and factual knowledge over affective content—that is, we appreciate facts and education. However, what comes to human creativity, most of the people have romanticists ideas about the phenomenon still today.

In other words, the basic idea about creativity seems to be the expectation that is put on anybody who makes an impact—they are expected to be flawless. Even worse, because creativity is associated with ultrahuman abilities even the creators themselves expect to be flawless.

The creators of today are assumed to act like their historical counterparts; the moral innovators, artists, and scientists—like the Mad Geniuses; a small elite that had an impact to the sociocultural environment. However, we tend to forget that the stories of these heroes are only glimpses of the full story. Any ~~creative~~ individual is not a superhuman.

Even though the modern creativity research has investigated these stories as well, and found out that they are mainly just stories, the media enforces the polished idea of a eminent creator. I will argue that it creates even more pressure in the modern world and for all the great minds who are harnessing their potential. The others, on the other hand, are not courageous enough to act because of how creativity is depicted: Irrationally.

Today a "creative person" often equals someone who works in the design field. "Creative" transformed into a noun from an adjective. I argue that this current trend speaks itself where consensus about human creativity is at the moment, and about the direction where it is going. However, being creative is so much more. It is true that sometimes the modern "creatives" tend not to finish for what they have started, but I will argue that it is mainly because they were wired that way. The common expectation, or a burden, for an established creative is that they are supposed to deliver "something different" with a constant pace. We were trained to deliver something extraordinary. Time after time. Day after day.

However, there is a major contradiction between how human creativity actually works in the light of neurobiological studies and the idea of productivity that, itself, demands for example the use of modern technology. Did the eminent creatives from the past work with their laptops

in open offices while the red notification bubbles kept on demanding their attention? No. Furthermore, I consider that for the modern creatives the lack of focus became a way to cope in a daily basis at their work.

The external demand is so high, that one can only keep up with the pace by efficiently seeking new sources of inspiration from the surroundings. Creative work does not end when the office' door closes, and the most best ideas often strikes when walking back home. However, if they themselves; the people in the creative field, are not aware why that occurs, then how they are suppose to explain the phenomenon to average Joes and plain Janes? In consequence the gap between creatives and the rest of the people remains wide. The phenomenon remains magical and ultrahuman, and inspiration appears to arise from thin air. I argue that *at least* the creatives should know how human creativity works and what it requires. They systematically manifest it everyday anyway.

Also, I consider that the modern researchers and scientists could use a hand in order to get their message through to a wider audience, and I believe that creatives could assist with that mission. However, the persistent social statuses, and the stigma on being creative, seems to make this collaboration difficult. This particular contradiction was the most surprising finding of this study: Creativity is more than often associated with the artistic fields yet today. However, today art is not as "cool" as factual knowledge—or so people claim, and still believe in the wildest theories behind human creativity. Both of these are rather classic misconceptions. What could bring everyday punsters, artists and scientists back together in order to work for a greater good? Correct data and interaction.

At the end of the day creativity *is* data. Human creativity has existed longer than its written history. The data about the phenomenon has a memory. Moreover, the purpose of human creativity has always been to develop something. Whether the impact would be big or small, the ability to create is meant for developing something—anything. Creativity generates something new, and the novel combinations are created from the collision of bits and pieces of data, that we exchange when we interact with each other and with the sociocultural environment.

Even though we are aware that perseveration to old information is anathema to creative thinking, the harmonious hum of ***Aha!*** is still missing because we like to hold tight on to the romanticist ideas about human creativity. Today when the phenomenon can be explained better than ever before, it has became more available for everyone.

However, in order to make everyone to acknowledge that the superpower is already built-in in them, I would like to give my last argument: Enhancing ~~creative self-confidence of everyone~~ *anything* would require a whole lot more of communication and collaboration across the borders of different social statuses. **Great minds think alike, but they create greater thoughts when put together.**

Reliability

"It would be an important topic to talk more about"

That was common end note of my chats with many non-designers. Discourse around the problematic and conventional nature of creativity has increased among the creativity researchers when coming closer to the 21st century. However, there is only a handful of people studying the topic. With a quick look, the amount of scholar articles about "discourse creativity" (i.e. Google Scholar) show a significant increase of studies, if only comparing the amount of publications in 1980–1985 (7,000 results) and 2015–2019 (+50,000 results). In 2019 alone there has been 9,400 scholarly articles about the discourse itself. Most importantly, the content of these publications have changed within these past decades as well. This is not in any way comparable or reliable data, but it shows that the topic interests the researchers as well.

There are at least one author who has been investigating the discourse itself; PhD. Camilla Nelson. Two of her publications (in 2010 and in 2015) describe the discourse on creativity, and how "Creativity is an invention brought about by a particular arrangement of knowledge" (Nelson, 2010). Respectfully, the Google Ngram data that seems quantitive is biased as we note in previous chapter. This is an important notion in the sake of the reliability of this study as well.

"Creativity" has become extremely complex topic to discuss because of the diversity in approaches and historical and economical strains that the phenomenon per se is accompanied with.

For these reasons I also consider that all the findings in this study should be investigated by several people especially from the fields of social psychology and neurobiology. I am an educated designer from the field of visual communication, and I do not consider myself qualified to draw reliable conclusions e.g. about the semantic similarities that were presented in this study.

It also seems that numerous studies on creativity have been missing quantitive tools to study the phenomenon from neutral starting points—this factor must be acknowledged all the time when reading this study as well. Creativity research is a new field of study that is still in its infancy—it studies creativity from psychological, and neuroscientific (i.a.

neurobiological, cognitive) perspectives and dates back only to the 1970's. Even though it has already given a clear view of what kind of a significance creativity will have in the future if the concept of creativity can be fully explained, it is still missing a lot of evidence (SAWYER 2011; SAWYER 2016; BODEN 2013; ZAIDEL 2013) (IBID.).

Most of the publications about creativity, and especially the most recent studies that have been conducted on creativity and/or creative thinking originates from the United States. These are also the factors that should be also taken into account when evaluating the reliability of sources, and their criteria in authority, objectivity, currency and coverage. The whole content of this study may not be legit in all "Western" regions' and cultures because different sociocultural environments across the continents and countries' border lines vary a lot. However, all the references that are included were at first investigated by this criteria that is mentioned above.

What comes to this study and its content, it is more like a compilation of information about creativity—a glimpse of what we know today—not only in "Western regions" but in modern, globally connected world. This study is compiled through critical discourse analysis and the questions that I have formed along the process. This approach was chosen because of the problematic nature of the topic itself (i.e. broadness), and the unreliability of qualitative–qualitative method.

Considering the frame of master's thesis, resources and the level of my own proficiency, a lot of valuable knowledge about the phenomenon is missing from this particular paper.

No matter how hard I have tried to provide accurate content in my study, I actually want to give a counterargument that there is no piece of knowledge in this world that would be completely accurate and non-biased when a human being is involved producing information. This issue, or insight, should come across rather clearly after reading this study.

Therefore I, myself, tried to reveal by own biases, intentions and personal goals as transparently as I could, so that reader oneself can self-assess the trustfulness of data that I provide. ***I had a blast throughout this study and I hope you enjoyed it too***.

Water flows and adjusts to obstacles; it changes as is required.

— RUNCO EXPLAINING THE EASTERN PERSPECTIVE ON CREATIVITY (RUNCO 2007, P. 148)

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APPENDIX

WRITTEN BY
ILLUSTRATIONS AND LAYOUT] **HEINI HÄLINEN**

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19 of the funniest things kids have ever said (2014, January)
http://www.buzzfeed.com/mikespohr/19-of-the-funniest-things-kids-have-ever-said#.ey6nKKyPL

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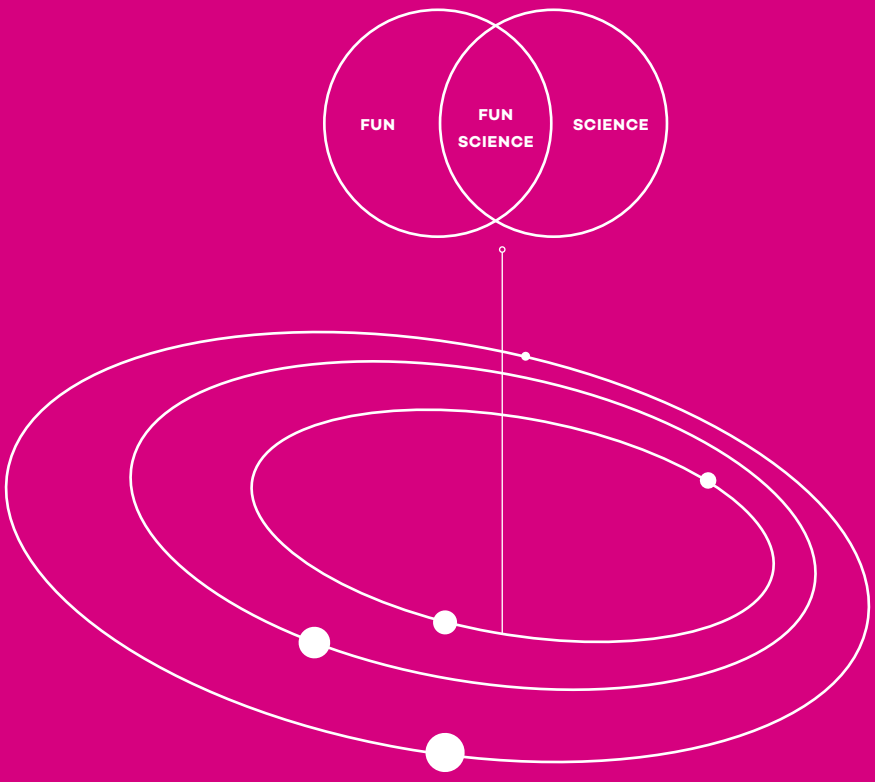
Panties are just pillowcases for butts.



Thinking is a complex mental process. Brain synapses and multiple chemicals are involved the process. Even though, I feel tempted to present this process to you thoroughly, let's keep it simple.

AVERAGE AMOUNT OF THOUGHTS EACH DAY

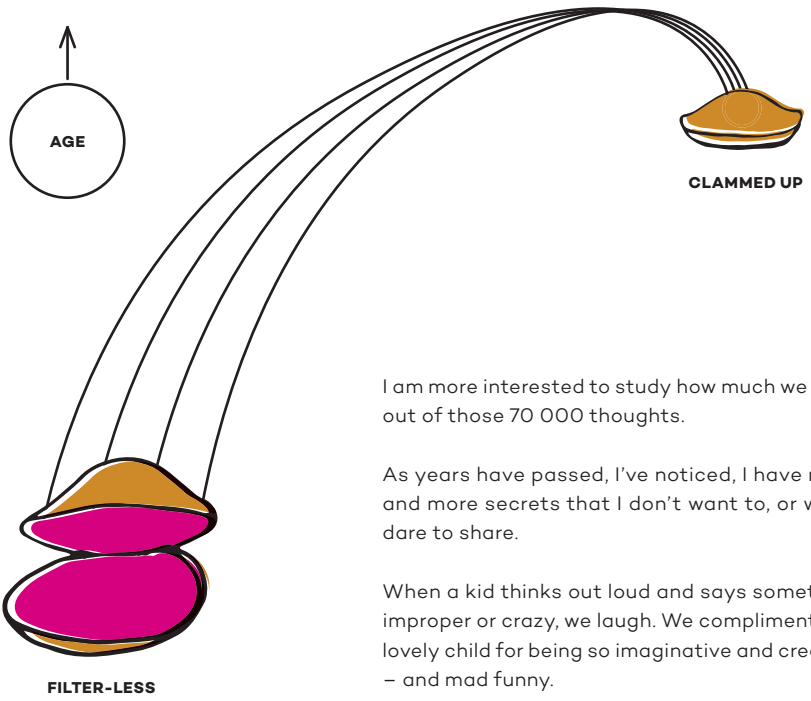
per every 7 billion

PEOPLE IN THE WORLD

When I was a child, I often found myself wondering how many people are breathing at the same time as I was. Immediately after, I was thinking how many people are having this same thought that I did.

This example of the thinking process, separates us from the animals. At least we humans think that. We produce astonishing amount of thoughts every day, willingly and spontaneously.

Blabbering rate



I am more interested to study how much we filter out of those 70 000 thoughts.

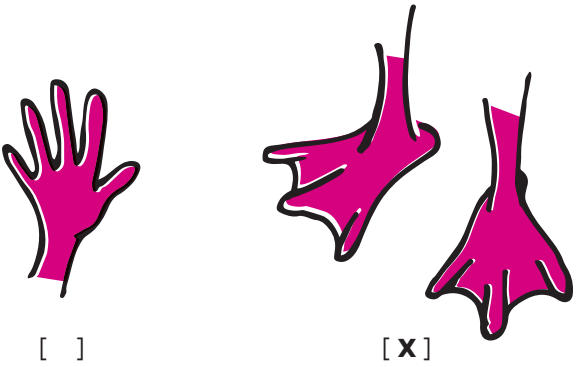
As years have passed, I've noticed, I have more and more secrets that I don't want to, or won't dare to share.

When a kid thinks out loud and says something improper or crazy, we laugh. We compliment this lovely child for being so imaginative and creative – and mad funny.

What happened? When the things I said weren't funny anymore?

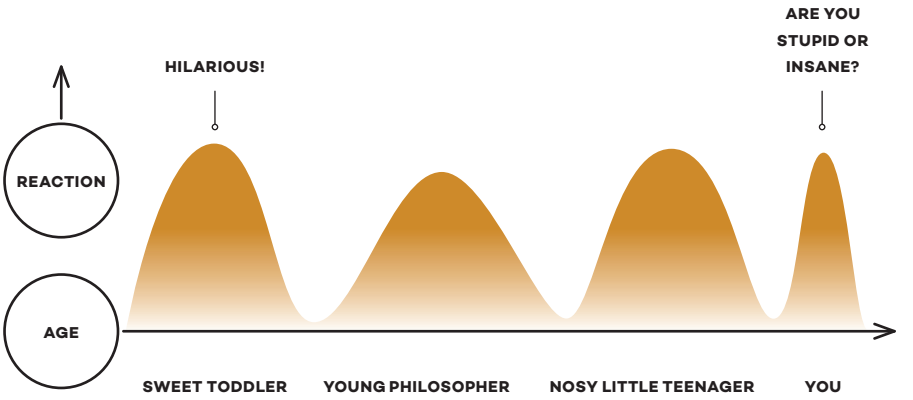
As we grow, we begin to say that one is tactless if speaking what is in one's head. We carefully consider what we say and we cherish the saying: "think before you speak".

Sanity rate

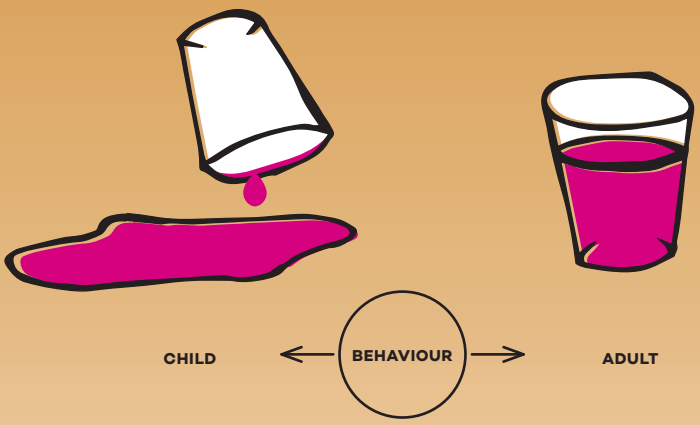


[ ] [X]

In the back seat of the car, heading to my home city, my 3-year-old nephew declared: “sheeps don’t have fingers, they are web-footed”. Someone might think, that is silly thing to say, but then and there, I realised in his universe this could be even true. And of course, it was absolutely hilarious. Now for a moment, think a sheep with the web-feet.



Once bitten, twice shy



Has our way of thinking changed as the wisdom in our brains has increased? No.

I bet, you thought about that web-footed sheep at least for a nanosecond. It would be sad, if all of those 70 000 thoughts would be just serious and intelligent. There must be a thought for the sheep too.

Sometimes I have faced serious crowds – family, friends, clients, colleagues or just total strangers – in my life, I have realised I need to consider carefully what I let out of my mouth. And this rule: "think before you speak", is valid even in the world of jokes. That lovely web-footed sheep would not be funny if I would've introduced him to you. I had to let him go years ago.

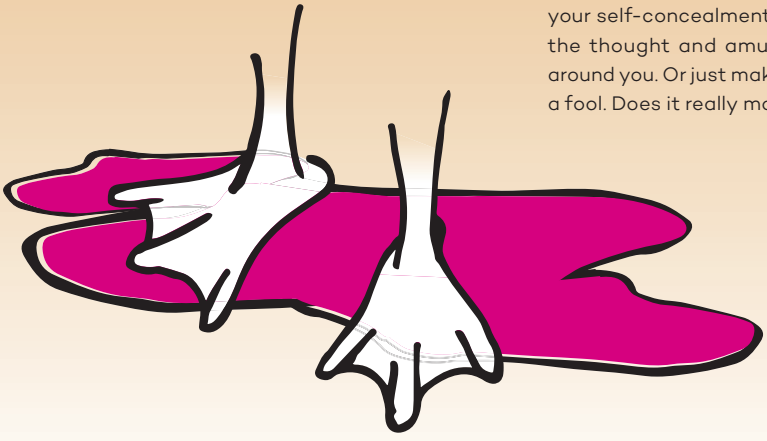
Kids have the courage to play with their thoughts and pour them down on us, while we put most of our thoughts aside and simply ignore them.

Laugh like nobody's watching

Now cheer up! Being an adult is not that bad.

Do you think, I have ever told that I wondered how many people are breathing at the same time? No, not until today. And I know, you have thought about it too.

You know those moments when you're thinking something so funny you are laughing out loud? Next time when that happens, let your self-concealment go, share the thought and amuse others around you. Or just make yourself a fool. Does it really matter?



HEINI HÄLINEN

DESIGN IS A PLAYGROUND

DOM-E1023 Discourse in Design
2016

I have always been interested in mental processes and understanding where creativity comes from. After being a graphic designer for almost ten years now, I have faced a couple deep, long-term design blocks. Blocks have raised a question – how to manage or control your creativity or non-creativity phases? How to keep up the creativity flow or how to get out of the tube of non-creativeness?

In this essay I examine creativity and being a designer from the neuroscience perspective. I search a neuroscientific answer to the question how to get your flow back and cope in between creativity boosts and designer's blocks.

TUBE

Exactly a year ago I found myself in a tube, completely stuck and suffocated. Working in an advertising agency from nine till five, executing dozens of design tasks per week, I felt all my groundbreaking ideas had vanished from my head.

Even after reading uncountable number of self-help articles and tips about "How to become more creative" I still couldn't get back my flow. How should I, because not even the creativity researchers or cognitive neuroscientists have yet found an ultimate answer to the question what creativity exactly is (Sawyer 2011, p.137, 151) and what causes "design blocks" which, I would claim every designer is aware of. Desperate self-analysis led me to reminesence: have I had similar design block before.

I found my answer. I lost my flow few years ago when I fell in depression. I couldn't even draw a line on a paper without questioning myself and turning on computer was just too much. Those nine foggy months changed the way I saw my career and shockingly, years later, I found myself almost from the same situation. I knew it wasn't about the attitude towards my work neither my motivation. I needed to change my way of thinking to be able to create something that pleased my perfectionistic mind as well. Things had to change.

Luckily that time, in just during one weekend I crawled out of that tube and decided to look at my office as a playground, my office computer as a toy and I started to see my design tasks as a play and the clients as my playmates. I got an extreme creativity boost and started to enjoy the play again.

Obviously, during this ten-year journey in the design field I have noticed that my creative flow comes in cycles. There are days – mostly nights – when ideas appear effortlessly and they seem all so executable. Then there are days – mostly under a lot of pressure – when nothing seems a good idea, or the idea is way too vague that an outsider would never get it.

Dietrich states that one should carefully consider which ideas are valuable enough to be taken to the next level because innumerous ideas "turn out to be incorrect, incomplete, or trivial" (p.1015). It is easily to be agreed, that one part of the design process is picking out the killer idea, and therefore you need to train your brain in various ways.

Among the fact that design is a never-ending learning process, as a designer, it seems even harder task to hold on to the swing that is rocking between the creativeness and the non-creativity, to fight against falling to that tube of total uninventiveness, and a try of being constantly more creative.

It is evident, that if one desires to swing higher and higher it all depends on oneself. To be able to enjoy that stomach dropping feeling of a great insight, a designer must every now and then look at their work from the worm perspective too. Just like a child would do. Just to find one's curiousity towards their playground time after time.

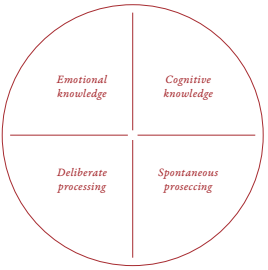
I am just turning thirty this year and I am already seeking at least some kind of feeling of the control of my designer mind, or a pattern to understand these cycles of the effortless flow of ideas and especially, to maintain the joy in the playground. But should I try to control creativity, is it even possible?

First, it must be repeated that both writers states that cognitive neuroscience of creativity is still in its infancy and only little is known about the brain mechanisms that underlie creative thinking (Dietrich 2004, p.1015, 1022; Sawyer 2011, p.137, 149, 151). Nonetheless, the studies have already contributed an understanding of creativity. Neither Dietrich nor Sawyer differentiate scientific inventions from different forms of art. The cognitive process behind the scientific and artistic ideas are much alike: "In art as well as science, the expression of a creative insight requires a high level of skill, knowledge, and/or technique that depends upon continuous problem solving." (Dietrich 2004, p.1015).

Every creative work begins with an insight, a sudden realization that tends to occur when the mind is defocused (Dietrich 2004, p.1015). However, an insight is still only the first step of the creative work and must be developed further. Sometimes, the insight takes months or even years to mature into a final "product" (Dietrich 2004, p.1014). Maturation of an insight, or creativity itself, "is essentially a Darwinian process; that is, it entails a variation–selection process (Simonton, 1997, 2003)." (Dietrich 2004, p.1015).

So, what defines are my killer ideas that appear on my mind during the darkest hours, creative or executable enough? Traditionally, creativity researchers and cognitive neuroscientists consider if something both ***novel*** and ***useful*** is generated, it must be a valuable insight (Dietrich 2004, p.1015). On the other hand, the whole question of creativity's nature is widely debated, and some researchers argue that insight does not even play any role in creativity, and that "creativity is essentially identical to everyday problem solving (Perkins, 1981; Weisberg, 1986, 1993)." (Sawyer 2011, p.142).

Where ever the truth lies, in my opinion, Dietrich's division in four types of "creative insights" can also be seen as methods that can help oneself to overcome creative tasks (Dietrich 2004, p.1018).



(**Figure 1**) Dietrich proposes there are four basic types of creative insights. Creative insight can be the result of two processing modes, deliberate and spontaneuous, contributed by emotional and cognitive knowledge (Dietrich 2004, p.1018).

According to Dietrich , the four types of the insights, extremes of two dimensions, occur when the mind process thoughts either *delibarately* or *spontaneously*, and consider those thoughts through either *cognitive* or *emotional* emphasis *(see Figure I)* (p.1018). Every creative idea share the "final common pathway" regardless which type of an insight has led to it (Dietrich 2004, p.1015).

Most often, the given design task is out of the area of designer's own special knowledge, it might not interest one at all or, a designer is asked to think outside the box, create something new and unique. I stand behind what Sawyer also points out, that "novelty is not sufficient to define creativity", because "almost every sentence people speak during the day is one that they have never spoken before" (p.150). Is novelty still overemphasized in, what is known as, *good design*? The unique and everytime new solutions created for any design problems, are created solely from our creative minds and they are based on our knowledge, which of course, in several cases needs to be expanded.

Expanding one's knowledge from certain fields leads us to Dietrich's first type of creative insight. Arising from the **cognitive knowledge, deliberately processed insight**, proves that creativity can at least somewhat be controlled. Dietrich offers a concrete example of this kind of insight: "Edison's systematic approach of inventing" (p.1018). In other words, systematically approaching the problem will create an insight which is, of course, highly depending on problem solver's expertise. "The more a person has knowledge, the more relevant items can be "juggled" in working memory" (Dietrich 2004, p.1018.).

Sawyer suggests that in the future studies there should be examined the role of automized routines in creativity which can be developed as a result of training and expertise (p.151). Being a graphic designer differs from other creative fields; painters, writers and actors. Where the designer needs

to be a painter and a writer at the same time while getting in to a role of an actor too. You need to learn your lines to be a professional actor.

Creativity can also be controlled by the creator. Secondly, a creative insight might occur from **emotional knowledge which is processed deliberately**. In this case, the insight is based on relevant information but is heavily effected by the basic emotions. "The knowledge most likely conforms person's norms and values", just like Picasso's Guernica (Dietrich 2004, p.1019). Sawyer states that the importance of association, particularly distant association, is confirmed by cognitive neuroscience to play a huge role understanding creativity and creative insights (p.149).

And now, please, hold on tight. You know that aha!-moment, the flow, the rush? What happens in while this aha!-moment is widely studied in neuroscience and by creativity researchers (Sawyer 2011, p.146).

My brains, just like everyone's brains, love the procrastination. Evidently, it is not always a negative thing. When you desperately try to solve a problem for hours without getting there, it is better to move your mind from original task to anything which is ordinary and the solution will suddenly just pop up in your mind. This method is called ***incubation*** not procrastination.

In a busy world of advertising for example, the deadlines rarely allow this method that might offer a new perspective to an original problem, but there is still hope.

Dietrich describes this third type of insight effortless and unintentional, and the most useful method when the solution requires "outside the box" thinking (Dietrich 2004, p.1019). **Spontaneously processed insight which arises from one's cognitive knowledge**, is also known as unconscious thinking, ***daydreaming*** [(I)], or ***mind wandering*** (Dietrich 2004, p.1018; Sawyer 2011, p.146). This sounds simple. Neuroscientifically this very complex process may be the

(I) "Anecdotal and historical accounts highlight the fact that associative combinational creativity during altered states such as dreaming or daydreaming can play a vital part in the creative process for the arts and the sciences" (Dietrich 2004, p.1018).

"During waking hours, people's minds wander between 15 to 50% of the time, depending on the task. The content of mind wandering is dominated by typical life events and is rarely focused on fantasy (Andrews-Hanna, Reidler, Huang, & Buckner, 2010; Singer & Antrobus, 1963)" (Sawyer 2011, p.146).

most productive method what comes to creative insights and is closely related to the same process in the brain than incubation. Again, the quality of these types of insights depends on expertise (Sawyer 2011, p.146.).

While letting your mind wander intentionally or unintentionally, your mind is offered with a brief moment of "mini-incubation" that could contribute a creative thought (Sawyer 2011, p.146). Most of the time mind wandering is unconscious. Sawyer states that "the role of unconscious progress toward insight is *partially confirmed*, consistent with the existence of an incubation effect, and with studies of intuition (e.g., Bowers et al., 1995).", and that "some neuroscientists have hypothesized that people prone to mind wandering may score higher on tests of creativity (Hotz, 2009; Tierney, 2010)." (Sawyer 2011, p.146, 149).

This is an insight when the designer has an imaginary "light bulb turning on", or a famous example of this kind of insight: "Newton is said to have thought of gravity while watching a falling apple" (Dietrich 2004, p.1019).

Dietrich's definition of the fourth type of an insight could as well be called the pain of the artist. **Spontaneously processed insight arising from the emotional knowledge** emerges when one has strong emotional experiences and is driven by the need of creative expression. This is when you get thrown out of the carousel and can not control your mind thoroughly. Because emotions do not require specific knowledge, the creative work based on these insights might require specific skills for appropriate expression (Dietrich 2004, p.1020–1021). Most examples of this type of insights are from the art world – in sciences insights depend heavily on the formal knowledge (Dietrich 2004, p.1021).

Now, spin your carousel faster, because according to Dietrich, a creative insight is never just one of these types in their pure form, but yet the insights "arise naturally from a mix of these four basic components" (p.1015, 1018).

PLAYGROUND

Whether the creativity is formed out of defocused attention, insights, or by the ability to deliberately direct attention to relevant information, effortful, everyday problem solving, these both are the results of sophisticated mental processes in the brain (Dietrich 2004, p.1013–1014).

Imagine your brain as a huge playground *(see Figure II).* There lies that carousel of insights in the middle. How these insights are developed further, to a creative solutions or to an actual design products?

Neuroanatomically, the edge of the playground is the ***neocortex***. The gate to the playground, the ***prefrontal cortex***, is responsible for selecting and processing all the content coming from inside the playground to consciousness, and is responsible to maintain the chosen content long enough, so what was first just an insight is now allowed to mature to a creative solution (Dietrich 2004, p.1011, 1014).

Now, divide your playground into four parts. Consciously and deliberately driven insights occur when entering to the playground, in the ***frontal lobe*** (Sawyer 2011, p.142). The front of the brain is associated with the highest, most deeply human abilities such as "abstract thinking, planning, willed action, working memory, and attention" (Sawyer 2011, p.138, 142). Frontal lobe also provides for "cognitive flexibility and freedom, and releases us from the slavery of direct environmental triggers or the memory stored in the TOP." (Dietrich 2004, p.1014).

You are now standing on the front part of your playground and in front of you is a hill, ***the central fissure***, which demarcates the frontal area from three parts on the back of your playground. Climb to the top of the hill and you will find the ***temporal***, the ***occipital***, and the ***parietal lobes***, also known as **TOP** (Dietrich 2004, p.1012). Dietrich has hypothesized that the spontaneous insights emerges from these TOP areas (Sawyer 2011, p.142). So this is where the creative play takes place.

(Figure II) Dietrich states that "**the neocortex**, integrates highly processed information and enable higher cognitive functions such as *a self-construct, self-reflective consciousness, complex social function, abstract thinking, cognitive flexibility, planning, willed action, source memory and theory of mind.*" (p.1013).

"**The prefrontal cortex** has a search engine that can "pull" taskrelevant information from long-term storage in the TOP areas and temporarily represent it in the working memory buffer. Once online, the prefrontal cortex can use its capacity for cognitive flexibility to superimpose the retrieved information to form new combinations" (Dietrich 2004, p.1016).

"The prefrontal cortex is the last structure to develop phylogenically and ontogenically (Fuster, 2000b). In humans, it does not fully mature until the early 20s. This conforms to frequent claims and might well be the underlying reason why the creativity of children is less structured and appropriate. Likewise, empirical evidence suggests that prefrontal functions are among the first to deteriorate in old age." (Dietrich 2004, p.1021.).

"According to Scheibel (1999), "we must assume that the more nimble the prefrontal cortex, the more capable it is of playing with new combinations of stored items (p. 3)" (Dietrich 2004, p.1016).

Damages in the prefrontal cortex causes errors and difficulties for solving out creative tasks successfully. Creative tasks require the use of working memory and without fully operational prefrontal cortex relevant past behaviour cannot be processed. (Dietrich 2004, p.1014.).

So, now standing on top of the hill, let's have a look at the TOP areas of your playground. Remember, this is the not guarded area, here you may play freely.

This is where your **long-term memory** is located. It is shown that long-term memory plays an important role in creative thought and of course, the skills one possess, the creative expression, an implementation of an insight (Sawyer 2011, p.151; Dietrich 2004, p.1020). Simply, the more knowledge is stored in your long-term memory the more even the unrational ideas can be provided for the creative solutions (Dietrich 2004, p.1021). The quality of these creative solutions can be improved by training and adding the amount of specific knowledge in one's mind (Sawyer 2011, p.149).

As a conclusion, could this also mean that the older is actually wiser? Some theories suggests that creativity is stochastic. According to other researchers creativity peaks in mid-life, between ages of 35 and 39, when the parts of the brain which are used for creative achievements reach their full capacity (Dietrich 2004, p.1021). And of course, there are researchers, who claims that too much knowledge may restrain creativity (Dietrich 2004, p.1020). So no, at least until today there is no proof that there is a certain play age.

Now, let's go down the hill to the frontal area. This area is different and highly controlled. Here all those ideas that might appear from your long-term memory are weighted if they get through the gate.

In repetition, the quality of the design solution is always evaluated how the original idea, an insight, is processed. "It is hard to imagine how creative ideas can occur in one's mind without continuity of thought and without the capacity to order information along the temporal dimension." (Dietrich 2004, p.1014).

"Continuity of the thought" could be presented also as **working memory**, combination of short-term memory, sustained and directed attention. It allows your creative mind

to "*hold on to a thought*" and orders those thoughts which are relevant for the solution (Dietrich 2004, p.1013). This deliberate mode of processing insights is useful when there is a particular problem that needs to be solved. In contrary, what comes to thinking out side the box, if you are using only your controlled working memory there is a limited space of solutions (Dietrich 2004, p.1016).

The ability of divergent thinking arises from both, unguarded and controlled areas. "The ability to break conventional or obvious patterns of thinking, adopt new and/or higher order rules, and think conceptually and abstractly is at the heart of any theory of creativity" (Dietrich 2004, p.1014). After all, it is critical to understand that creativity requires the whole playground, even the parts that seems most dull.

Sawyer states that "the same brain areas are active that are active in many everyday tasks – even in ordinary tasks that people do not associate with creativity", routine like (p.149). "The overall message emerging from these studies (cognitive neuroscience) is that creativity is not dependent on any particular mental process or brain region" and "the entire brain is active when people are engaged in creative tasks." (Sawyer 2011, p.149, 151).

Therefore, Sawyer suggests, that in the future studies of cognitive neuroscience should concentrate more specifically mind wandering which seems to be an effective tool for creative insights (p.151). "Majority of the studies has confirmed the existence of an incubation effect and these hypotheses include **mental relaxation**, selective forgetting, random subconscious recombination, and spreading activation" (Sawyer 2011, p.146).

"One of the most solid and consistent findings of cognitive neuroscientific studies is that the brain's resting state is quite similar to the problem solving state; to conceptual processing; and to memory retrieval (see citations in Smallwood & Schooler, 2006)." (Sawyer 2011, p.141).

The mental relaxation, the brain's resting state and sleeping, that are beneficial for creative insights, and could be compared to a breeze that blows on your playground. The strenght of the breeze varies between very light wind – when one doesn't even consciously notice it – to a mild warm summer breeze that makes one awake and alert but yet relaxed (Sawyer 2011, p.139, 144, 145).

That most settle breeze is blowing when one is having **deep sleep**, which is regarded to have the most creative potential (Dietrich 2004, p.1018). Dietrich states that although during deep sleep brain's has areas that are inactive, "there is also little indication of abstract thinking, active decision making, cognitive flexibility, and focused attention in dream stories." (Dietrich 2004, p.1017–1018).

From unconscious brain we are able to retrieve information – not only associated items but also, the items that have no kind of connection with each other – and combine these items into novel solutions (Dietrich 2004, p.1014). "Thus, dreaming might be regarded as the most extreme form of the spontaneous processing mode and can give rise to insights that are difficult to come by during normal waking consciousness." (Dietrich 2004, p.1018). There is nothing new under the sun, when you bump into a design block, basically researchers suggest you to "*sleep on it*".

While awake your working memory and the front area of your playground will rip up the most executable ideas.

Although, the creativity researchers nor cognitive neuroscience of creativity can not provide the ready-made answers about creative mind, the study results might give hints how you should build your playground to the next level.

Simply put, be fascinated about everything, retain the curiousity you once had as a child and learn new things – *expand your knowledge* to feel more in control. You will never know which even the most random bits and pieces of knowledge you will need for to reach your goal.

If the routinely achieved design solutions start to feel boring – which most often occurs – and you want to add some fun, the creativity boosts and the creative insights, on your playground, you need to rely on that the gained pieces of knowledge are merely playing hide-and-seek in your own mind.

It is a never-ending play to find and take a control of these hiders but you, and only you, are the seeker. For the sake of flow experience you need to let go of any control, defocus and let your mind wander.

After all, the creative insight was already there, hidden on your playground.

"In the world of observation,
chance only favors the prepared mind."

– Louis Pasteur (Dietrich 2004, p.1018).

A *slightly sentimental* LETTER FOR *each and* EVERY GREAT MIND OUT THERE

The information that I have translated, selected, and gathered from multiple scholarly books and articles has existed for years now. For me it took years to learn, internalise and understand it. Moreover, the data was completely new for me. Apparently I knew barely anything about creativity even if creativity is the tool that brings food on my table. **If anyone, at least us modern day creatives should know what human creativity is about, right? Well at least I didn't.** Not before I begun my exploration. It took two more years to compile everything that I had learned and to find a voice that could convey everything I had learned for the reader.

During this study it became obvious how insufficient the resources are in creative education, that could prepare people for their future careers a bit better. Pretty much the only advice is to *"stand behind your work no matter what"*. Show no hesitation in front of your audience, swallow the critique and move forward. That has given the evaluators the permission to judge the piece of work in whatever way they want. However, the thing that they usually does not know, is that every creation includes a piece of our inner selves that us modern creators are revealing willingly. That piece is essential for the creation itself, but it makes us vulnerable while we stand naked in front of the audience.

At the moment the preparations that are done during our training don't include information about the historical burden of creativity. The practical knowledge and education about the dated, yet popular conceptions on creativity are missing. The things that we will have to face when we enter the work life and dive in to the deep end: The expectations that are set on us as creators, our individual personalities, and the expectations set on our creative manifestation and creations. It should not be considered a weakness nor incompetence when we bend. It shouldn't be us who have to Google what is myelin.

All the bits and pieces of data that I learned became these lines of text that you are now reading. A book—just another few kilobytes of novel data that has not existed before. There are numerous books about creativity, and thousands and thousands more lines of information. **However, what is it worth when no one can spare even just a day and explore them in-depth?** For this reason I see this book more like a script for something that ~~can~~ should be transformed into an experience. We learn effectively through experiences.

There is so much new knowledge about the phenomenon of human creativity, but how come no one has looked at how the older myths can affect on individuals or us modern creatives?

Why on earth no one has asked from us designers what is creativity? We are creators who are living on an interface where art and science overlaps. We are juggling in between the old-fashioned beliefs; the archetype of an artistic creator, and in the world full of expectations that are awaiting for functional solutions delivered in tight time frames. A designer cannot numb oneself. We are required to remain sensitive and empathetic because otherwise we would only generate unusable designs. We are required to remain systematic and rational in order to finish for what we have started. We are balancing on a thin blade of emotion and reason. Us designers, the established storytellers and communicators, and the filters of data, are living in grey area in the polarised black-and-white world.

I realise that for some people it may be confusing that we cannot be put in one solid, unambiguous box that could explain how creativity manifests in us. We can't fit in in any one of them. We do not match with the popular ideas about creativity, and yet, we are considered creative. Apart from these contradictions and pitfalls, something keeps us going. That is what I found. **Creative self-confidence**.

Us designers have the skill to transform complex and irrational information into visible and palatable ideas, and turn those ideas into functional tangible objects. The driving force that keeps us going is our own creative self-confidence, and a profound belief that we seem to trust without a question: We are resilient because we believe that there is a purpose with what we do—that the products of our minds are meant for the betterment of the other people around us. If there needs to be a box, or a category, then I consider that all the modern-day creators are ***meliorists***. We act when others doesn't. Furthermore, most of the time we enjoy the process too. *Most of the time,* but not always.

When the pace of creating and the idolisation of productivity breaks the creative mind, and all the popular misconceptions on creativity are added to the mix, the stew is ready. A creative mind is flexible but it does not bend endlessly. There are not enough good reasons to move forward. We quit, and give up on the job that used to be our dream—and for what reason? I would like to ask how many more trained creative professionals we are ready to lose?

Today when creativity is a demand in so many fields and vocations, also outside the creative fields, then exactly **how shocking warning would be needed from the scientists this time, until we really believe that stress and business are killing higher thinking skills and make us do poor decisions?** How many more studies and books will be needed before productivity is replaced with *healthy* efficiency? **Is it so, that the stories on human creativity would first have to go viral before we can understand and appreciate the limitations of human embodiment that is required for creativity?**

PAGE 186

Time & Zeitgeist

Expression & creation

PAGE 162

"Much of what's been written about creativity until now has romanticised it, invoking the divine Muses or the inner child or the deep subconscious. Creativity glows like an alchemist's gold, always mysterious and just out of reach."

(SAWYER 2013, P. 17)

Creator

Disruptive innovations

Major events & communication

PAGE 108

"There is no great genius without a touch of madness."
(Seneca, 5 b.c.e.–65 ad.)

The rationalist conception on creativity (i.e. Aristotelianism) continued through the Renaissance, and thrived again in the Age of Reason.

Superhuman force *generates novel creations.*

Creators have no special social status. They who work in artistic trade (sculptors, poets) are considered craftsmen, and in fact they have *a lower status* than e.g. butchers and silversmiths. (Artistic) creators are simply *imitators* of the established masters. Inspiration, or **creative thinking**, is associated with heightened states of consciousness (i.e. Platonism).

However, the completion of **creative expression and production** is considered conscious work that requires rationality and deliberation (i.e. Aristotelianism). In fine arts, **the successful creations** are accurate representations of nature. Masters own all the creations of the studio even though the actual work is completed by the regular workers.

FAMOUS CREATORS, CONTRARIANS AND MORAL INNOVATORS: Socrates (EXECUTED), Jesus Christ (EXECUTED), Cicero WAS EITHER BANNED, FLED HOMELAND OR COUNTRY, OR OSTRACISED, Dante WAS EITHER BANNED, FLED HOMELAND OR COUNTRY, OR OSTRACISED

Archimedes of Syracuse WAS KNOWN FOR HIS MILITARY INNOVATIONS, AND IRRIGATION SYSTEMS THAT ARE IN USE YET TODAY.
EUREKA!

"Divine madness" (Plato) ≠ *"Melancholic"* (Aristotle)

Enthusiasmos

THOSE WHO WERE GIFTED AND INSPIRED BY THE DIVINE, OR POSSESSED BY A DEMON.

Rational

"MELANCHOLIC" DOES NOT REFER TO DEPRESSION. ANY MENTAL ILLNESSES WERE NOT BELIEVED TO CONTRIBUTE IN CREATIVITY.

CREATIVITY WAS GRANTED FOR INDIVIDUALS SELECTED BY GODS

MASTERS owned all creations of the studio, even though the actual work may have been completed by regular workers; the **EVERYDAY PUNSTERS** who attributed every creation to the master.

Training and knowledge *are necessary for any creation.*

Creators begin to work apart from institutions. The social status rises when nobility starts to value the most talented ones, and they gain recognition for their knowledge and their genius. Creators become members of a prestigious minority. **Creative thinking, creative expression and production** requires reason and education. **Successful creations** are created by the most talented creators, that are not only imitators but also those who can capture *originality*; "the truth of observation" and newness (da Vinci; Vasari)—the term became widely accepted in the late Renaissance.

Please note: That time an attribute of **"originality" did not mean a radical break with convention.**

QUALIFIED AS A MASTER BEFORE HITTING HIS 30S: Leonardo da Vinci

Isaac Newton (17th c.) CONCLUDED THE COPERNICAN REVOLUTION

PAGE 166 PAGE 181

Copernicus' publication in 1543 ignited the Copernican Revolution which eventually led to the SCIENTIFIC REVOLUTION; a series of events that marked the emergence of modern science developments in mathematics, physics, astronomy, chemistry, human anatomy and biology. During this period people begun to understand the human body (e.g. Andreas Vesalius and his team of unknown illustrators were known of the unforeseen precise images of human anatomy).

"Genio" (da Vinci)

Renaissance Man

MASS PRODUCED PAINTS, FRAMES, AND BRUSHES: The modern concept of the artist—isolated, independent, inspired—could only emerge after all of these social and economic developments." (Sawyer 2006, p. 14).

Approved idea or solution:
VITRUVIAN MAN (15TH C.)
THE CARAVEL (15TH C.)
FLUSH TOILET (16TH C.)

Rejected or controversial idea:
HELIOCENTRIC WORLDVIEW BY COPERNICUS (1543)

PAGE 185

STATUTORY PATENT SYSTEM (1474)

THE TERM "ORIGINALITY" IS COINED

Approved idea or solution:
LAWS OF MOTION BY NEWTON AND HELIOCENTRIC WORLDVIEW (17TH C.)
COMPOUND MICROSCOPE (17TH C.)

Rejected or controversial idea:
UNICELLULAR ORGANISMS BY LEEUWENHOEK (17TH C.)

"IMAGINATION" IS COINED (HOBBES, 17TH C.)

THE GREAT FAMINE (14TH C.)
BLACK DEATH (14TH C.)

The Printing Press

THE THIRTY YEARS' WAR (1618–1648)
THE GREAT PLAGUE OF LONDON (17TH C.)
REVOLUTIONS IN AMERICA AND IN FRANCE
THE PROTESTANT REFORMATION (16TH C.)

Romanticists idealised Ancient Greeks, and borrowed ideas from the Classical Antiquity: **"The glory that was Greece, and the grandeur that was Rome."** (Edgar Allan Poe, 1845)

A first course of Charles Darwin, Sir Francis Galton, believed that birth order contributes to exceptional abilities: **"Genius runs in families"** (Galton, 1869)

Creation is a unique message from the inner muse of an individual.

Creators are the communicators of their unique, inner messages. **Creative thinking** occurs spontaneously, and it requires temporary escape from the conscious ego, and the liberation of instinct and emotion. **Creative expression** is its purest when the spirit of an individual captures the essence of the divine nature of humanity. In **creative production** rational deliberation kills the creative impulse, and it is executed from an overflow of powerful feelings. **Successful creations** do not have to necessarily meet the society's normal standards of taste.

The new concept of "genius" (18th c.) was associated with a rational creator who was still spontaneous. Genius' worked consciously and deliberately, and the creative thinking processes were based on imagination, judgment, and memory.

Vincent van Gogh (ASSIGNED TO LUNATIC ASULYM) PAGE 166
Paul Gauguin (CRIME, ASSIGNED TO LUNATIC ASULYM)
Egon Schiele (CRIME)
Oscar Wilde (CRIME)
Nietzhe (ASSIGNED TO LUNATIC ASULYM)

ROMANTICISM ≠ RATIONALISM

the independent, eccentric ≠ *the extraordinary, intelligent*

Mad Rebel PAGE 171 Mad Genius Hereditary Genius

MENTAL ILLNESSES ARE ASSOCIATED WITH CREATIVITY IN THE 1830's.

THE END OF STUDIO SYSTEM

INDIVIDUALITY

INDIVIDUALITY PAGE 158 PAGE 164

CONSCIOUS, PRECONSCIOUS, UNCONSCIOUS ARE COINED BY FREUD

Approved idea or solution:
STEAM ENGINE BY WATT *KICKED OFF THE INDUSTRIAL REVOLUTION* **(1770's)**
THE FIRST MAN-MADE PLASTIC BY PARKES *IMPACTED ON FILM AND PHOTOGRAPHY INDUSTRIES* **(1856)**
THE THEORY OF EVOLUTION: NATURAL SELECTION BY DARWIN AND THE CONCEPTS OF ADAPTATION AND DIVERSITY (1859)

Rejected or controversial idea:
GREAT MAN THEORY, ORIGINATING CARLYLE'S BOOK (18TH C.) *INFLUENCED ON 19TH CENTURY POLITICAL MOVEMENTS (E.G. NAPOLEONIC ERA 1799–1815)*
GERM THEORY OF DISEASE AND SNOW'S STATISTICAL DATA MAP AND DIAGNOSIS OF CHOLERA (19TH C.)

The Age of Oil– *The Atomic/Nuclear Age*

FROM THE 1900 TO MID-20TH C.
MODERNISM (I.E. ANTI-ROMANTICISM) IS CHARACTERISED BY ISOLATION, COOLNESS, AND DETACHMENT. RATIONALISM IS REBORN

ARCHIVAL STUDIES (BIOGRAPHIES) PAGE 115

WALLAS' TESTS ON CREATIVE PERFORMANCE & ALCOHOL, 1926

The benefits of alcohol can be easily misunderstood, because even if generating a huge number of ideas intoxicated, can also mean that they are poorly evaluated—alcohol decreases the ability of judgment.

THEMATIC APPERCEPTION TEST (TAT), 1928

PSYCHOPATHOLOGY & CLINICAL APPROACHES ON CREATIVI

PSYCHOANALYSIS BY THE INFLUENTIAL AND **CONTROVERSIAL** FOUNDER SIGMUND FREUD PAGE 129

THE 12 JUNGIAN ARCHETYPES (1947)

EEG TESTING (1930's)

SOCIOCULTURAL PERSPECTIVE THEORY BY VYGOTSKY (1930's)

PAGE 183

The *crystallising moment* with discovery of DNA

Creativity lies in personality *& behaviour.*

"(...) If I had to express in one word what makes their personalities different from others, it's complexity. They contain contradictory extremes; instead of being an individual, each of them is a multitude." (Csikszentmihalyi, 1996). The personality tests have pointed these following traits as the most common ones on established creators, and that they are: nonconforming, unconventional, rebellious and highly autonomous—"(...) it would be difficult to rebel if you [are] depended on other people"), radical risk takers who are also tolerant to risks and ambiguity, intrinsically motivated, open to experience, curious, playful, eccentric, and sensitive, and having wide interests, self-efficacy, preference for complexity, and psychological androgyny. On the other hand, implicit theories can also reveal personal or cultural biases. (Runco 2007)

(OVER 10 HITS IN CORPUS) *Most similar words for*

PAGE 149

"creativity" →

"creative"

SEMANTIC CHANGE

1900	1910	1920	1930	1940
elemental ↘	inventive ↘	inventive ↘	dynamic ↘	inventive ↘
latent ↘	latent ↘	dynamic ↗	inventive ↗	imaginative ↘
constructive ↘	elemental ×	latent ×	imaginative ↗	poetic ↘
primal	constructive	spiritual	spiritual	intellectual
dynamic	primal	**poetic**	**mystical**	dynamic
selective	**interpretative**	**intellectual**	intellectual	spiritual
sensuous	**imaginative**	imaginative	poetic	mystical
intellectual	**spiritual**	**aesthetic**	**self-expression**	constructive
mechanical	**plastic**	constructive	**ennobling**	sensuous
volitional	**spontaneity**	primal	**mastering**	aesthetic

THE WORLD WAR I, THE "SPANISH FLU"
FIRST ANTIBIOTIC BY FLEMING (1928)
ELECTRICITY FOR HOUSEHOLDS (EARLY 20TH C.)
Cinema

GREAT DEPRESSION, THE WORLD WAR II
NUCLEAR WEAPONS AND BOMBS (1930's TO 1945)
SYNTHETIC LSD (1938)
Television

The Space Age–

FROM MID-20TH C. TO 1970
NEO-ROMANTICISM & ROMANTICIST MOVEMENT OF EXPRESSIONISTS IN 1950's, POSTWAR

The Information Age–

THE DIGITAL REVOLUTION–

The

1980

TY

(...) Creativity benefits from **divergence** and **originality** (Guilford, 1968), as well as personality studies that suggest much the same (perhaps in different terms)." (Runco 2007, p. 56)

THE STRUCTURE OF DNA (1953)

NEUROIMAGING STUDIES IN THE 1950's

PERSONALITY & CREATIVITY — PAGE 115

PERSONALITY STUDIES BY IPAR IN THE 1960's — PAGE 140 — PAGE 173

TORRANCE TESTS OF CREATIVE THINKING (1966, AND 1974, 1984, 1990, 1998, 2008)

ADJECTIVE CHECK LIST (ACL) BY GOUGH (1960's)

THE BIG FIVE (B5) OR FIVE FACTORS MODEL (FFM) ORIGINS IN HIPPOCRATE'S FOUR TYPES OF TEMPERAMENT

DEVELOPMENTAL THEORIES ON CR

PIAGETIAN MODEL (1970's)

"PAREN OF C

DISCONTINUITY THEORY

MRI (1970's)

RIGH

PAGE 166

ELECTRODE IS ATTACHED to Dr. Einstein's forehead by a brain specialist in order to pick up the brain's tiny electrical impulses, magnify and record them for study. As many as 16 electrodes at a time are sometimes used to give eight curves showing simultaneous action going on in various parts of the brain.

(THE NEW YORK TIMES ARCHIVES, 1951)

"Geniuses aid tests of brain processes;
Einstein's brain-waves being recorded"

"Everything great in the world comes from **neurotics**. *They alone have founded religions and composed our masterpieces."*

— MARCEL PROUST, 1961

1950	1960	1970
subjectivity ↘	spirituality ↘	immediacy ↘
rationality ×	subjectivity ×	creative ×
terdependence ×	immediacy ↗	self-reliance ↘
immanent	**vigour**	aesthetic
immaturity	**selfhood**	**sophistication**
culture	**sexuality**	**altruism**
dynamism	**creativeness**	**inventiveness**
self-sufficiency	**uniqueness**	**spirituality**
homogeneity	**mysticism**	**creativeness**
faustian	**aesthetic**	**artistic**
dynamic ↘	inventive ↘	imaginative ↘
inventive ↗	imaginative ↗	creativity ↘
imaginative ↗	dynamic →	dynamic ↘
intellectual	constructive	artistic
spiritual	**creativity**	inventive
constructive	**artistic**	**innovative**
conceptual	**humanitarian**	constructive
intellect	**educative**	intellectual
selfless	spiritual	spiritual
poetic	selfless	selfless

THE WORD "CREATIVITY" IN CORPUS

THE COLD WAR
...NUCLEAR WEAPONS AND BOMBS
...SYNTHETIC LSD.

BABY BOOM

RECES

PC

ARPANET, Email (1971)

Wo

THEORIES ON CREATIVITY

PAGE 95

"PARENTAL CREATIVITY PREDICTS CREATIVITY OF CHILDREN" (RUNCO & ALBERT 1985)

MOOD STUDIES (1980's)

EARLY THEORIES: EMOTIONAL INTELLIGENCE (1990's)

RIGHT-BRAIN & LEFT-BRAIN CONTROVERSY

PAGE 145

STUDY: 'CREATIVITY AND ARTIFICIAL INTELLIGENCE' (BODEN 1998)

STUDY: 'CREATIVITY CRISIS' 1990–2010 (KIM, 2011)

SOCIOCULTURAL APPROACH ON CREATIVITY

NEUROBIOLOGICAL STUDIES ON CREATIVITY

"Eysenck (1995) formulated **a theory of creativity and the brain** that proposed the importance of disinhibition (i.e., less neuronal activation), especially in the frontal lobes. Thus, while the interplay of both neuronal excitatory and disinhibitory processes characterize studies of creativity, the focus on neuronal disinhibition, particularly within the frontal lobes, predates **the advent of modern neuroimaging studies**." (Bristol et al. 2013)

"Genius: The Natural History of Creativity presents a novel theory of genius and creativity, based on the personality characteristics of creative persons and geniuses. Starting with the fact that genius and creativity are related to psychopathology, it uses modern research into the causes of cognitive over-inclusiveness to suggest possible applications of these theories to creativity. H. Eysenck reports experimental research to support these theories in their application to creativity, as well as considering the role of intelligence, social status, gender and many other factors that have been linked with genius and creativity. The theory traces creativity from DNA through personality to special cognitive processes to genius."

Eysenck, H. J. (1995). *Problems in the behavioural sciences*, 12. Genius: The natural history of creativity. New York, NY, US. Cambridge University Press.

1980	1990
spontaneity ↘	inventiveness —
inventiveness ↗	spontaneity —
sensibility ×	resourcefulness ↘
immediacy	self-reliance
altruism	originality
self-reliance	**vitality**
creativeness	**sophistication**
originality	creativeness
vigour	**virility**
artistic	**perseverance**

1980	1990
inventive ↘	imaginative —
artistic ↘	inventive ↘
creativity —	creativity ↗
imaginative	**hands-on**
innovative	artistic
constructive	innovative
entrepreneurial	**nurturing**
dynamic	stimulating
selfless	entrepreneurial
stimulating	constructive

STUDY: 'THE COGNITIVE NEUROSCIENCE OF CREATIVITY' (DIETRICH 2004)

PAGE 123

EMOTIONAL CREATIVITY

"Emotional creativity is as distinct from emotional intelligence as is IQ from creativity, and it 'refers to personal evaluations of events, judging, and reacting to personally significant information'." (Runco 2007, p. 121).

DEVELOPMENTAL NEUROSCIENCE PAGE 122

"CREATIVITY" (GOOGLE NGRAM) PAGE 149

The creation is measurable brain activity. Creativity can be enhanced. We all possess creative potential.

inventiveness
spontaneity
originality
empathy
resourcefulness
self-reliance
creative
spirituality
individuality
intellect

"Robert Weiner (2000, p. 113) has argued that globalisation is expanding this Enlightenment individualism beyond Europe, into a 'global ideology of creativity'. Before we can explain creativity, we need to delve into these conceptions of creativity, because they get in the way of the scientific explanation of creativity." (Sawyer 2006, p. 19)

2000 2010–

imaginative
creativity
hands-on
artistic
inventive
constructive
innovative
musical
filmmaking
collaborative

Creative

(NOUN)

PAGE 189
PAGE 210

6TH MASS EXTINCTION, GLOBAL WARMING, ANTIOBIOTIC RESISTENT BACTERIA, PLASTIC IN THE OCEAN, WARS AND CONFLICTS...

Water flows and adjusts to obstacles;
IT CHANGES AS IS REQUIRED.

(RUNCO 2007, P. 148)

SCHOOL OF ARTS, DESIGN AND ARCHITECTURE
AALTO UNIVERSITY